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Nature in Avon

2003 Volume 63

Bristol Naturalists' Society

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NATURE IN AVON

THE PROCEEDINGS OF THE BRISTOL NATURALISTS' SOCIETY
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EDITORIAL

This year's issue contains very welcome articles on dragonflies and fungus. I feel that it would be a useful addition to the Proceedings and a benefit to the Society as a whole if there were to be an annual report on the status of our lesser known plant and animal groups. Perhaps there are members of the Society who collect such data on a yearly basis and could help the Society by submitting articles on their findings. These could include such things as fungus, dragonflies, amphibians and reptiles.

If members wish to contribute to the journal I would encourage them to read the *Instructions for Authors* reproduced on the inside back cover of the Journal. Adherence to these makes the life of the Editor so much easier.

Once again, the Editor must accept responsibility for any typographical errors that may have been reproduced in this issue, and for these he sincerely apologises.

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Proceedings of the Bristol Naturalists' Society (2003) 63:3-9

Ida Roper

Mary Beckett

In January 2003 a project began to research and catalogue the herbarium of an eminent 20th century Bristol botanist. Ida Mary Roper was born in Bristol and spent the majority of her life in the city, but for various reasons she bequeathed her collection to the University of Leeds shortly before her death in 1935. Funded by the Arts & Humanities Research Board for one year, the aim of the project is to improve access to the collection and make it available to a wider audience. This is being achieved by improving the physical and mental retrieval of specimens by using a database, digital techniques, research and the creation of a website. The collection is being examined in a broader context than botany alone to help people realise its potential as a resource for a wide range of disciplines, particularly social history. As the project nears completion, a handwritten inventory of each Genus represented has been entered onto an *Access* database but more detailed cataloguing of a proportion of the collection is still ongoing, as is the digitisation. The following article outlines Miss Roper's life and career and will provide an overview of her herbarium.

The most significant source of information I have on Ida's early and personal life is a handwritten document found folded in the pages of a copy of J.W. White's 'The Flora of Bristol' (1912). The book originally belonged to Mrs Cecil Sandwith and her son Noel, both well known West-Country Botanists and contemporaries of Ida. It is now in the possession of Professor A.J. Willis at Sheffield University, who kindly sent me a photocopy of the document and suggested that Mrs Sandwith probably wrote it, possibly shortly after Ida's death. Mrs Sandwith and Miss Roper were only six years apart in age and would certainly have known each other well, particularly through their connections with the BNS. I have used the facts in the document as a basis for much of my research on Ida but some of the details regarding her relationship with her half-brother Frank are virtually impossible to either support as truth or deny as fiction. They provide a fascinating insight into the life of Miss Roper and whilst the document must not be ignored, it is very important to remember that it is the story from only one perspective (and whose, we cannot sure).

Ida Mary Roper was born on 29th August 1865 to John Abraham Roper, a wholesale druggist, and his wife Lucy Emma at 16 Hampton Terrace, Westbury. The couple already had one son, Harold, and Mrs Roper had two sons from a previous marriage, Ernest and Frank Samson. The family are said to have moved to a house in Great George Street when Ida was still young, but by 1879, when Ida started at Clifton High School for Girls they lived at 1 Oldbury Villas.

The various home addresses suggest to me that they were an upper middle class family who could afford a servant and employed four men in the family business (at least in 1881).

It has not been possible to establish when Ida's interest in botany started to develop, or indeed why, but I think it probably stemmed from her father's occupation as a chemist, especially as her brothers seemed to share the interest but had less time to pursue it. It is difficult to know whether Ida was taught Natural History at school. One of the reasons it was so popular with children was because it was not a subject on the school curriculum until the end of the 19th/beginning of the 20th century. However, generally science, including botany, was taught at girls' schools because Classics was still seen as the male reserve and some schools chose to teach it from about the 1880s. According to the handwritten document, Ida finished her education in Germany. Although I do not know this for definite, it is certainly possible and is a very interesting idea as Germany was the centre for botanical study during this period and knowledge of German was accepted a useful tool.

At some stage in the late 1800s Frank Samson, one of Ida's half-brothers, became her guardian and set up home for them both at 4 Woodfield Road, Redland. According to the document he was of great assistance in collecting specimens and conducting research and was 'an active supporter of all that his sister undertook'. Also it describes how they 'both possessed a thoroughly business sense of organisation, allied to caution. They would never state a fact (and did not mind admitting that they could not answer a question) unless they could verify their statements by facts and they would take any amount of trouble to do this'. Frank's name appeared in the Proceedings of the BNS and on sheets in the herbarium.

Ida did not appear to work, for money, at any time in her life. In the census of 1901 Ida's occupation was recorded as 'Living on own means.' Miss Roper therefore put all her energy into her 'hobbies' and was very committed to the voluntary positions she held.

In 1929 Frank Samson died, leaving Ida alone at 4 Woodfield Road. Sometime in the early 1930s Miss Roper moved to 176 Chessel Street and was looked after by Rev. Cratchley, curate of St. Aldhelm's church, Bedminster. Ida died on June 8th 1935 having been ill for a while. Her funeral was held at St. Aldhelm's and her body was interred in the family grave at Arno's Vale cemetery. The reputation of Ida amongst natural historians, archaeological enthusiasts and in the city of Bristol is evident by the list of mourners at her funeral. For example representatives from Bristol City Museum, the British Bryological Society, the Bristol Naturalists' Society and the British Microscopical Society attended.

Also, the BNS and St. George's Church, Brandon Hill both made collections for memorials of some sort. Her closest remaining relatives appear to have been the wife and family of her late brother, Harold.

Miss Roper's career as a botanist seemed to begin in the early 20th century, as attitudes towards women started to change. In 1908 she had her first paper 'The Blossoming of the Trees', published by the Bristol Naturalists Society. The following year Ida became a fellow of the Linnaean Society, only four years after they first admitted women. For the first years of the 20th century Ida was also very busy helping James Walter White compile a 'Flora of Bristol', published in 1912, which I think raised her profile and put her in contact with many individuals and societies. In the Preface, White acknowledges Miss Roper for her 'trustworthy & energetic help' and 'for fieldwork' and 'assistance in literary research and in revision and correction of the press'. In 1913, Ida became the first female President of the Bristol Naturalists Society. She recognised it as a great honour and a fantastic position to hold, not just for herself but also for all women. Miss Roper worked tirelessly for the Bristol Naturalists Society and held the positions of Editor, Secretary, Librarian and Sub-librarian over a period of 30 years. Unfortunately Ida was frequently disappointed by the lack of interest in the Society amongst the general public and by the participation of members. Many of her annual reports tell of cancelled excursions and unimpressive exhibition nights. It seemed that during the middle years of the 1920s despite Ida's best efforts interest in the society was especially low. Luckily the tide turned towards the end of the decade and I think that was in no small part due to Ida's determination and hard work. Ida herself exhibited at almost every meeting. Her contributions included an exhibition of nine examples of scarce alien plants at the General Meeting in October 1915 and showing Doubling flowers of *Cardamine pratense* with petaloid stamens and Types and Varieties of plants at two of the Botanical Section meetings in 1926. Ida's Papers published in the Proceedings covered subjects such as 'The Blossoming of the Trees' (Proc. BNS. 1908 4th Series, Vol. II Part II p.66-67), 'The Flower of Bristowe' (Proc. BNS. 1909 4th Series, Vol. II Part III p.5-8), 'Permanency in the Growth of Plants' (Proc. BNS. 1915 for 1914 4th Series, Vol. IV Part II p.121-128) and '*Spartina Townsendi* in West Gloucestershire' ((Proc. BNS. 1923 4th Series, Vol. VI Part I p.49-50). It is clear that Miss Roper's dedication to the Society never waned, for in her BNS Obituary (4th Series, Vol. VIII, Part 1) H. Stuart Thompson wrote 'Although she had been in ill health for nearly a year, it was chiefly for the B.N.S. that at times she bravely continued her work'. However, the BNS was not the only society with which Ida was associated. She was actively involved with the South-Western Naturalists Union, the British Bryological Society and the British Association for the Advancement of Science, acting as Local Honorary Secretary in 1930 when the meeting was held in Bristol. Ida's prominence in Bristol society grew hugely as a result of putting on a display of wild flowers in

the city museum every week for 12 years, from 1911 to 1923. These displays were reported to have been very popular with the general public, particularly during the Great War. Miss Roper really was dedicated to British botany and established a very well known name for herself, not only in the West, but countrywide.

Ida had other interests she was very passionate about and worked hard at those too. Most notable was her study of archaeology and more specifically monumental effigies. In 1931 she had a book "Effigies of Gloucestershire" published and she was the first woman to be elected to the Council of the Bristol and Gloucestershire Archaeological Society. It is clear that her passions for history and botany often overlapped, for example her BNS Presidential Address for 1914 was on 'Some historical associations of flowers' and in the Somersetshire Archaeology and Natural History Society Proceedings for 1921 (1922) appeared an article on 'The earliest British Herbal'. Ida also produced pamphlets and guidebooks and embroidered wall hangings and alter frontals for St. George's Church Brandon Hill.

Miss Roper began her herbarium in 1893 and continued to add to it until a year or so before her death in 1935. I am unsure if she was collecting prior to 1893 but it does seem from the specimens at the University of Leeds and other institutions that the main period was c.1900 - 1930. Most of the British Plant Families are represented in the herbarium. There is a large number of Genera from the *Orchidaceae* and *Violaceae* Families; the latter reported to be an area of particular interest to Ida. Another noteworthy feature is the specimen of *Nitella mucronata* discovered growing in a pond in Wickwar, West Gloucestershire by Miss Roper in 1917. The discovery was significant as it was the most western recording of that species in England and was described by Groves and Bullock-Webster as a distinct variety, which they named *gracillima* (Journal of Botany, November 1917, Vol. 55). Correspondence from Mr. Groves and Rev. Bullock-Webster and a script handwritten by Ida for a talk on the subject to the BNS on October 4th 1917 exist in the herbarium. In a collection of Carophytes bequeathed to the University of Leeds by Groves and Bullock-Webster there are specimens of Nitella *mucronata* var. *gracillima*, cultivated from one of the plants sent by Ida. Ida travelled extensively in this country, often on various club and society excursions and added to her collection. However, she collected most actively close to home in Gloucestershire and North Somerset (vice counties 6 and 34). From the three Families already catalogued in detail, *Violaceae*, *Characeae* and *Orchidaceae*, the following are typical collection locations in the Bristol region: Leigh woods, Chew Magna, Symonds Yat, Cadbury Camp, Yate Common, Wickwar, Sharpham, Abbots Leigh, Ozleworth and Berrow. Ida also seemed to travel quite frequently to locations on the south coast, from Cornwall to Hampshire,

and into south and mid-Wales. She also went on expeditions to Ireland and Scotland. A photograph of Miss Roper gathering specimens in Rome suggests that her 'botanising' did not stop on home ground. Many of the specimens in the herbarium were obtained through exchange. Ida was an active member of The Botanical Exchange Club of the British Isles and the Watson Botanical Exchange Club. To give an idea of the quantity of material Ida was submitting, in 1915 Ida sent in 255 specimens including *Rubus hirtus* from King's Wood, Yatton, collected on the 27th July and 18th August and *Rubus caesius*, from Highwood Lane on 8th August.

A feature that makes Ida's collection particularly delightful and unusual is presence of associated material. Many sheets have letters, articles, and coloured diagrams of flowers, postcards, photographs and lengths of embroidery thread or pieces of textile attached. In addition, there are many other loose items and the University was lucky enough to receive her collection of botanical books. The bequest included many county floras, her personal and heavily annotated copy of White's 'Flora of Bristol' and exercise books she used to record details about her herbarium. The items form an integral part of the collection.

Miss Roper arranged her herbarium according to 'The London Catalogue of British Plants' (Tenth Edition, and later, the Eleventh Edition). W.H. Burrell, Honorary Curator of the University of Leeds Herbarium in 1935, rearranged it according to the 'The British Plant List, 2nd edition' by Druce published in 1928 and this is how the collection remains. Various Honorary Curators of the herbarium, particularly Mr Burrell, added material to the collection and these are now considered as part of the herbarium.

Ida started to arrange the bequest of her herbarium several years before her death, in the early 1930s. According to a contemporary letter, she had approached Bristol University but they were unable to take the collection due to lack of space, having accepted Mr White's herbarium in 1932. The Bristol Naturalists' Society was similarly short on storage. Ida then approached Professor Priestley, a friend and colleague for over 30 years. Professor J.H. Priestley knew Ida from his time at University College Bristol, both as an undergraduate and later as head of the Botany Department (1905-1911). In 1911 he took up the post of Professor of Botany at the University of Leeds, where he remained until his death in 1944. Miss Roper and Prof. Priestley appear to have kept in contact over the years and met up occasionally at meetings of the British Association for the Advancement of Science. Professor Priestley accepted the bequest with open arms realising its value to the university and local botanists. The practical arrangements of the transfer from Bristol to Leeds were made between Rev. W.J. Cratchley, with whom Miss Roper lived at that time, and Mr W.H. Burrell, Honorary Curator of the Leeds

herbarium. On the morning of Saturday 15th June 1935, the herbarium and cabinets were delivered to the University by Pickfords, with the bequest of botanical books arriving in August courtesy of GWR! The herbarium remained where it was delivered, in the Baines Wing, for over sixty years. In 1997 all of the biological collections moved to the new School of Biology and the herbarium has been allocated its own room in the L.C. Miall building. Over the years the collections have received varying levels of care, ending up rather neglected by the 1990s lining the walls of the tearoom. By 1997 however, the herbarium was under the care of Dr J. Edmonds, Honorary Curator. Dr Edmonds took the opportunity of the move to compile an inventory of all the botanical collections and freeze specimens that had an active insect infestation.

In addition to Miss Roper's personal herbarium there are numerous other specimens associated with her in collections around the country. According to the entry for Roper, Ida Mary in Kent and Allen's 'British and Irish Herbaria' (1984) her name appears in Bristol City Museum (90+), Liverpool Museum, The National Museum of Wales (400+), Nottingham Natural History Museum (Wollaton Hall), University of Oxford and the Pharmaceutical Society of Great Britain. Looking into these claims I have found that NMW certainly has a large number of specimens associated with Ida but maybe closer to 300 than 400. Examining the database kindly sent to me by Dr. Tim Rich of NMGW it is clear that the collection is broad in terms of geographical location, date and specimen type. The collection includes an example of Nitella mucronata from Wickwar and although the majority of the specimens are from Vice-Counties 6 and 34, locations as far north as Scotland are represented. Dates extend throughout Ida's lifetime, and in some cases even before and after! The Natural History Museum at Wollaton Hall in Nottingham seems to have a similarly diverse collection as Wales but smaller (just over 100 specimens). In November 1930 Miss Roper received a letter from the Director of the museum, Professor J.W. Carr, requesting her assistance in extending their British Herbarium, which she appears to have duly done. There are various histories noted for the specimens. The majority are Ex. Herb Ida Roper, some were acquired through the two Exchange Clubs, a few are associated with Nottingham University and she also appears to have collected some specifically. Little is known about the specimens at Oxford and Liverpool, other than there are some! At Oxford there are 'a large number of specimens' (Clokie, H.N., 1964) throughout the Druce herbarium, most of which were probably obtained through the Botanical Exchange Club. At Liverpool the specimens are distributed amongst the main herbarium and as only a fraction of the collection is on a database, it is only possible to search for particular taxonomic groups. Ulster Museum, Belfast has 72 specimens collected almost exclusively in vice counties 6 and 34. In the various herbaria housed at Bristol Museum there are specimens collected by Miss Roper. There is definitely a separate collection of hepatics, which once belonged to Ida. In

addition some of Ida's books survive at the museum including 'Journal of a Naturalist' and various archaeological texts.

I hope this article has served to introduce you to your first female President, a botanist of immense energy and enthusiasm, who did everything to the best of her ability. I hope you will be interested enough to investigate the collection and the individual further. She was active until her dying day and fervently dedicated to the Bristol Naturalists' Society. She put her life and soul into her herbarium and that is why continued custodianship is so important. The herbarium and associated material is a very valuable resource that has been seriously underused in the past. This current project aims to reverse this trend and bring a renewed interest to botany and natural history.

Mary Beckett

Proceedings of the Bristol Naturalists' Society (2003) 63:10--11

Professor Arthur J Willis

Richard Bland

After almost forty years Professor Arthur Willis has written his last Bristol Botany for Nature in Avon. He is a botanist with a fine record at Bristol University and later at Sheffield, with many books and articles to his name. While working in Bristol he was Editor of the Proceedings from 1959 to 1967, and over the years he has contributed a number of important articles on local botany to it. They included a detailed study of the Gordano Valley in 1959, a comment on the 18th century botanist Dr A. Broughton whose herbarium book had been discovered in 1970, a study of the Avon Gorge vegetation in 1989, and a history of the development and botany of the Berrow Dunes in 1990.

His annual accounts of Bristol Botany began in 1965 when he took over from Noel Sandwith. He followed a tradition that had originally been started by J. W. White in 1909. From 1913 to 1930 White wrote an annual article, which was initially, a record of plants at new sites unrecorded in his Flora of 1912, but which became in time a broader account of botanical change. White died in 1932, and there was no annual record between 1931 and 1934, but it was revived in 1935 by Mrs. Cecil Sandwith. She followed the pattern set by White, commenting on the impact of the weather, and on species at new sites, or rediscovered at old ones after a long gap. She was assisted by her son Noel from 1948, and he carried on alone after her death, aged 90, in 1961. He began creating a card index file for the creation of a revised flora, but died suddenly in 1965 aged 63. His file is still with Arthur Willis.

Arthur Willis left Bristol for Sheffield in 1967, but it would be impossible to guess from his annual report that he was no longer resident in the region. His deep knowledge of the Bristol area, combined with the records of a succession of eminent botanists, as well as his knowledge of the work of the BSBI, ensured that he sustained White's tradition. He had his own special interests, in particular the phenology of plant development and the long history of particular rare plants at specific locations. He also was quick to pick up errors by those whose knowledge was less profound than his. The thrill of the rediscovery of a species long thought lost was always present. He was also strong on alien flora, which Mrs. Sandwith had made her own speciality in the 1930s, at a time when the docks dealt in a wide variety of foreign products, each with their own seed adulteration. As the docks deal now only in cars, coal and chemicals, much of this fascinating flora has vanished, though a few hardy remnants live on.

He always ensured that references in botanical literature to the Bristol region were mentioned, and reflected sympathetically on the work of local botanists who died. He was an enthusiastic supporter of the younger generation, and

encouraged the production of the new Avon Flora in 2000.

It is astonishing that just four individuals have been responsible in the past 95 years for sustaining a continuing and detailed commentary on the changing flora of the region. Each has contributed to raising public awareness of successive threats to the flora and each has helped move the whole conservation agenda forward. We have been exceptionally fortunate, and the challenge faced by Arthur's replacement is formidable.

R. L. Bland

Emerald Damselfly *Lestes sponsa*

Proceedings of the Bristol Naturalists' Society (2003) 63:12-15

Swete's Flora Bristoliensis - 150th Anniversary

Dr Clive Lovatt

The preface of Edward Horace Swete's Flora Bristoliensis is dated May 1854, making this month the 150th anniversary of its completion. JW White's Bristol Flora 1912 includes an account of the book and its writer and his helpers (to some extent, added to here); an obituary was published in the Journal of Botany after his death in that same year. It was the "book of the week" at the Bristol Reference Library in August 1941.

The flora covers a five-mile radius from the centre of Bristol as shown on a large hand-coloured map. Swete explained that this was based on "mature consideration" in order to cover an "essentially local" but "highly diversified" flora. It is said that Swete would walk from Bristol, where he was a medical student, to Blagdon, some 10 miles away, to spend the weekend at the home of his father, John, a clergyman. A radius of five miles meant that all places could be reached on foot in a day. G.H.K. Thwaites earlier had used a 10-mile radius for compiling a plant list for the plant geographer HC Watson, and the Bristol Naturalists later selected a nine-mile radius before abandoning it in favour of the area in Sanders' map of the Bristol Coalfields and adjacent country (roughly, the short-lived county of Avon).

The flora is a substantial contribution to the knowledge of the plants of the Bristol area, and more particularly of the Avon Gorge, my continuing area of interest. It aims at completeness in terms of the taxonomy of the day (810 species are included according to White), whereas the catalogues of the previous decades were selective, and typically had no more than a hundred or so species. This is the book's great value, for it provides many first local records, and many last ones too; and it constitutes a snapshot of the local flora at the time just before major change.

1854 preceded the demolition of the Hotwell House, the introduction of the railways, the completion of the Clifton Suspension Bridge (1864) and the passing of the Downs Act (1861), which effectively converted Clifton and Durdham Downs from a common of pasture to a place of public recreation. Thus Swete recorded plants such as *Erica tetralix* on the Downs and opposite whereas the more recent Flora of the Bristol Region (2000) has not a mention of it in a much wider area. Such detail invites comments and a number of copies I have seen are annotated, including White's own.

There are, as in any such work, errors and omissions. Swete needed help with willows and sedges. There is only one form of spiked speedwell on St Vincent's Rocks, though there may just have been two Solomon's Seals in

Leigh Woods. *Thalictrum minus* was undoubtedly still where Thwaites knew it. But then it took White over 20 years to confirm the record of *Brachypodium pinnatum* in Swete.

The flora is well balanced between the topographical and (though the term had not been invented yet) ecological introduction and the plant lists. The latter are a model of transparency as Swete indicates the source of each locality record, whether they are his own observations as so many are, or those of others, or herbarium or (rarely) historical records. Swete was, nonetheless, familiar with the prior explorations of botanists of national and local standing. T B Flower (also a medical Doctor by training; White "touches lightly on his foibles"), claimed to have written the first half of the book and that Swete hoped its publication "would introduce him to Practice". Examination shows that Flower's clearly acknowledged critical notes are confined to the earlier species. Flower's annotated copy was seen by White but has since regrettably been lost.

Swete, born in Redland in 1827, was 27 at the date of the publication of his only botanical work. It was reportedly commenced only two years earlier, although in a rare dated record he notes seeing an alien grass, *Phleum asperum,* near Kingsweston Inn in 1845. He also reproduces what may be a genuine label for *Orchis* (now *Anacamptis*) *pyramidalis* from his herbarium of the same date. I have, however found but one of his gatherings, *Sedum forsterianum*, collected from St Vincent's Rocks in October 1852 and preserved in the Gloucester Museum herbarium.

Evidently there is no trace of Swete's name at the Bristol Medical School though he claimed on the title page of his book to be a lecturer in Botany there. Swete married Sarah Anne Bailey in 1857 and they had nine children. In about 1860 he was living in Worcester. In 1870 he published the Handy Book of Cottage Hospitals and he is described as the founder of the Cottage Hospital movement. He was in fact based in Somerset and retired to the South Coast. A miniature portrait of him in later years still in the ownership of the descendants of the famous religious writer he turns out to have been related to, shows him with piercing eyes, a full white beard, a butterfly-wing collar and a flower in his buttonhole. He was said to have been an enthusiastic gardener.

E.H. Swete c1890

It is interesting to note who were Swete's helpers, and who were not. The 1840's were an active time for botany in Bristol, but GHK Thwaites, an accountant and the local secretary of the Botanical Society of London left in 1849 (having missed out on an appointment as a Professor of Botany in an Irish University) to become the Superintendent of the Botanical Gardens in Sri Lanka. Thwaites' own herbarium was consulted by Swete but is now lost, though many distributed duplicates exist. HO Stephens (like Swete, a medical Doctor) gave access to his published Catalogue of 1835 (a local plant list of the more interesting local plants) and his herbarium (now in Bristol Museum) but did not show Swete the site of his remarkable find of 1847, *Allium sphaerocephalon,* despite again collecting it in 1853, nor did he reveal the identification of *Cerastium pumilum* at about the same time.

L.H. Grindon, by then in Manchester was not consulted. J.H. Cundall was collecting at the time but is not mentioned. His herbarium is lost, save for scraps obtained by White, including *Cephalanthera longifolia* collected below the Downs in 1853, and unknown to Swete. GO St Brody who produced just two years later a similar flora for Weston Super Mare is not mentioned, but perhaps his interest in the Bristol area came later with the intent to compile a Flora of Gloucestershire.

Miss Jane Powell provided Swete with localities from Henbury. Her herbarium is (still, for it was seen there by White) in Bristol Museum and her beautiful volumes of plant paintings and manuscript lists, covering a much wider area, are in the Botany Department of Bristol University. *Geranium purpureum*, also unknown to Swete was, so far as I can tell, collected and clearly distinguished by her and Miss A Carpenter (of the famous Bristol Unitarian family of social reformers and naturalists) in 1837 in its present locality under Leigh Woods.

A photograph dated 1856 shows Miss Martha Maria Atwood at her microscope, a stern looking lady. She plainly had a critical eye and it was she who announced the commencement of the flora in 1852. Her collection of an unusual looking whitebeam in Leigh Woods in that year is described in Swete's flora and is preserved in HC Watson's herbarium at Kew. It is *Sorbus bristoliensis*. She too left Bristol and also had an address in Worcester around 1860.

Swete also mentions observations and herbaria of Dr Fox and Messrs Rootsey, Pritchard, Etheridge, Foster and Ellis. Rootsey had also (like Flower and Stephens) published a short Catalogue of local plants. It is highly likely that some or all of these herbaria were destroyed when the Bristol Museum was bombed in 1940, to judge from the despairingly sparsely documented list of

collections removed from the Museum attic in May 1918 (e.g.: "A herbarium of over 1,000 species, in 8 volumes…consists chiefly of Bristol plants…collected during the years 1834-6; "Small collection of Bristol plants –no history").

The book is quite rare and is therefore expensive when it appears on the second hand market. My own copy, recently bought, cost £100, but is quarter bound in leather, interleaved (1863 watermark) and annotated in the unknown hand of an amateur naturalist (it was presented, with much love, to Lizzie, possibly of Dursley, in 1864). At the time of writing there may still be a copy or copies at Maggs Bros Limited of London, one (£160) inscribed but not signed by the author and interleaved but "not significantly" annotated.

Though a small volume of 138 pages (including index), plus 26 of introduction and one of errata it is a marvellously constructed book, quite complete in itself. It is not the dry compilation it may seem at first glance. Where now are the ponds on the Downs with *Chara* growing in them? Where is the Black Valley in Leigh Woods? Where now is *Sedum telephium*, live-long on St Vincent's Rocks? Why, they all live on captured by EH Swete's piercing eyes and preserved for posterity this 150 years in the pages of his Flora Bristoliensis.

Dr Clive Lovatt
Blantyre
Malawi

Broad bodied Chaser *Libellula depressa*

Proceedings of the Bristol Naturalists' Society (2003) 63:16-21

Dragonflies and Damselflies of Backwell Lake
Ted Waring

Regular monitoring of the Odonata at the site was carried out during the period 1993 -2003. The lake was visited about twice a week, on sunny days at noon, from April to October. Numbers of each species were counted except for the most prolific damselflies. Some figures are given below. Occasional use is made of earlier records. Variations of marking are described. To tell how far these are local or regional would require further investigations elsewhere.

A man-made habitat

Dispersal and the colonisation of new sites is part of the regular behaviour of dragonflies and damselflies and greatly assist the survival of many species, allowing them to adapt to a changing landscape. They are quick to find new areas of surface water including those created by human activity, whether for ornament or utility. Shallow pools suit them best, preferably with marginal vegetation.

Backwell Lake was constructed in 1974/75. It lies in a field close to the railway station, and can be seen from the platform. Its purpose was to reduce flooding in the low-lying area between Backwell and Nailsea: it is what is known as a 'balancing pond' taking water from the River Kenn, and draining into the same river further downstream.
Oval in shape, it is about 300 metres long, giving about one km (check metric) of water-margin, and with a central island, intended as a bird-refuge. One's first impression of the lake is that it is full of birds. Out on the lake are dabbling and diving ducks: swans and gulls congregate around the car park. Sometimes we have visits from Heron and Great Crested Grebe.
The site is owned by Wessex Water, and was declared a Local Nature Reserve in 1995. It serves a dual purpose, being also a popular recreational facility. Regular: maintenance enables the visitor to walk around the reserve, while leaving undisturbed an area of abundant lakeside vegetation. Willow and alder were deliberately introduced. Reedmace rapidly established itself in the shallow water. Less common plants include the Sweet Flag and the Flowering Rush.
The River Kenn runs through the reserve on the southern side, being confined to a narrow channel. A ditch runs along the north and west sides of the field. Both river and ditch are important for damselflies. Only a hedge separates the Backwell Lake site from another smaller reserve, known as Netcott's Meadow, managed by the Avon Wildlife Trust. It is notable for its orchids and many varieties of insects.

THE DAMSELFLIES – Zygoptera

Family: Calopterygidae

Beautiful Demoiselle - *Calopteryx virgo*
Banded Demoiselle - *Calopteryx splendens*
The usual understanding about the Demoiselles is that *C. virgo* occupies the upper parts of streams where the water flows faster and is therefore better oxygenated, while *C. splendens* prefers, or at least tolerates, the slower-moving waters downstream. Intermediate zones may occur, where the two species mix.

This pattern seems to be followed in North Somerset generally. The River Kenn at Backwell is slow moving and it has *C. splendens*. Rather unexpectedly, we have *C. virgo* as well, one or two per annum. The big surprise was in 2001 when we had 18 *C. virgo* on 29th May: 5 in the lower part of Netcott's Meadow, where there is no moving water, 4 by the exit-channel from the lake and 9 on the river. This event has not recurred, and nothing similar was reported from elsewhere.
The Banded Demoiselle, *C. splendens*, can be found each year on the River Kenn, at the western end of the site, and at the lake outflow. Recently they have been present in ones and twos, whereas we had 5 or 6 in 1987-90. In 1989, on a 200-metre stretch of the river, 1 km to the west, there were 21.
Sometimes *C. splendens* can be seen flitting over the surface of the lake. This happens from July onwards. Is there a late emergence of a lake-dwelling population? Probably not. The river channel is narrow and becomes choked with weed. Once a year it needs to be cleaned out: this is done in July. My suggestion is that some damselflies transfer to the lake at that time, and remain there.

Family: Lestidae

Emerald Damselfly - *Lestes sponsa*
We are fortunate in having this attractive damselfly. It inhabits the levels of NW Somerset, and can be found also in the vicinity of Chew Magna. Otherwise it is scarce (and perhaps has always been so) in the region. It emerges in late June, and a few can be seen among the grasses at the lake's edge, perching with wings half-open.
Some books describe the pterostigma or wing-mark as black: others have it as brown. Photographs taken at Nailsea Moor in 1994 and at Backwell Lake in 1995 and 2001 show it as brown, bordered laterally with pale sections of orange or buff colour. None of the field-guides consulted mentions this detail, nor do they illustrate it. How widespread is it? News from elsewhere would be welcome.

Family: Coenagriidae

Large Red Damselfly - *Pyrrhosoma nymphula*
The Large Red is the first of the Odonata to emerge in the spring. My earliest 'first sighting' was on 9th April 1993. Mostly they can be found along the northern ditch and at the pond in Netcott's Meadow. Numbers are not large: up to a dozen at any one time. Mating can be seen at the pond, and exuviae have been found there. Exuviae are the outer skins of the aquatic larvae, left behind when the adult insect emerges.

Azure Damselfly - *Coenagrion puella*-
Common Blue Damselfly - *Enallagma cyathigerum*
We have hundreds of 'blue' damselflies every summer. At close range one can distinguish the Azure from the Common Blue. With insects flying out over the water, it is not so easy. The Azure appears first and the Common Blue lasts longer into the autumn.

Blue-tailed Damselfly - *Ischnura elegans*.
The lake is a good place to examine closely the various forms of the Blue-tailed, because of its numbers and density. A black triangle is often to be seen on the blue abdominal segment (segment 8) of the female, in the red form *rufescens*. Similar effects have been reported from elsewhere.

THE DRAGONFLIES - Anisoptera

Family: Aeshnidae

Hairy Dragonfly - *Brachytron pratense*
This is an uncommon dragonfly, restricted to certain environments. Places like the Somerset Levels provide it with a suitable habitat. Close to the edge of the levels and between the River Kenn and the railway lies the wooded area of Nailsea Ponds, which has a well-established population of *B. pratense*. Sometimes in spring a Hairy Dragonfly may be seen in flight over the Backwell Reserve, They were thought to be stray visitors until, in May 1995, 3 exuviae of *B. pratense* were recovered from a small pond in Netcott's Meadow. So we have evidence of its breeding in the area, at least temporarily.

Southern Hawker - *Aeshna cyanea*
The Southern Hawker wanders freely and can turn up anywhere. From July onwards it can be found hunting in suburban gardens, and is willing to breed in garden ponds. It has adapted itself to living in the proximity of human beings. One has been seen in a supermarket. It is not camera-shy. With care, you can bring your lens to within inches of a perching *A. cyanea*.

Brown Hawker - *Aeshna grandis*
Common Hawker - *Aeshna juncea*
Despite the existence of a colony in Gordano, the Brown Hawker has been avoiding Backwell. One appeared once, in 1984. We had to wait 12 years for another. From 1997 to 2001 we had several sightings during the autumn, always of single specimens. We have not had any since.
On 28th August 2000 a brown-bodied dragonfly of *Aeshna* type was hovering at the water's edge. The lack of colour on the wings ruled out *A. grandis*. It was possibly a female *A. juncea*. They breed on Mendip and occasionally stray into other parts of Somerset.

Migrant Hawker - *Aeshna mixta*
The most remarkable event in the dragonfly calendar at Backwell Lake is the autumnal influx of the Migrant Hawker. Where they come from, we do not know, but the regularity of their arrival suggests a nearby source, but we have no proof. The species is capable of long distance travel. It was named at a time when all examples in the UK were believed to have come from abroad.
They appear first in August, in woodland. They fly there in groups, the males being unusually gregarious. Only later, in September, do they resort to open water, for mating. The table below gives the highest counts at the lake for recent years, and the dates of these maxima.

Year	Number	Date	Year	Number	Date
1993	26	11/9	1998	31	19/9
1994	21	27/9	1999	49	09/9
1995	35	23/9	2000	33	04/9
1996	45	25/9	2001	65	14/9
1997	42	26/9	2002	43	21/9

With migrants from the continent one would expect more variation of numbers and dates. With local emergents one would expect to find at least a few exuviae, which we don't find. A substantial population of *A. mixta* inhabits the Somerset Levels near Glastonbury. Do some travel northwards from there? In September 2002 a few *A. mixta* males were noticed to have whitish or cloudy wing tips.

Emperor *Anax imperater*
A large dragonfly seen in flight over the lake from mid-June onwards is likely to be the Emperor. Given the size of the lake, and the speed of the Emperor's flight it is difficult to tell how many there are at any one time. Sometimes they come into conflict with the Black-tailed Skimmers. They seem to be in constant flight, seldom found at rest. A photographic -opportunity was missed, for lack of a camera on the day that one was discovered caught in a spiders web, and released.

Family: Libellulidae

Black-tailed Skimmer - *Orthetrum cancellatum*
Another local speciality is the Black-tailed Skimmer. Up to 19 have been counted. This may be as many as the lake can support, given the territorial nature of the species. Maximum numbers were as follows: -

Year.	Number	Date	Year	Number	Date
1993	16	01/7	1999	18	26/6
1994	18	07/7	2000	18	26/6
1995	10	08/7	2001	18	02/7
1996	13	17/6	2002	12	23/6
1997	19	07/7	2003	18	20/6
1998	12	03/7			

Notice that before 1999, the maximum usually took place in the first half of July. Since then it has shifted forward into June. It is well known that the species likes to perch on bare earth or stone. They benefit, it seems, from the warmth of the sun, reflected from such surfaces. There is very little bare earth at Backwell. What attracts the Skimmers is the amount of stone or concrete that exists at the various inflow and outflow channels.

Broad-bodied Chaser - *Libellula depressa*
Four-spotted Chaser - *Libellula quadrimaculata*
We have a few Broad-bodied Chasers, distinguishable from the Black-tailed Skimmers by the width of the abdomen. Although it is common on the moors, the Four-spotted Chaser is very infrequent at Backwell, One was seen in May 1998, in conflict with a Black-tailed Skimmer. The two species coexist at Nailsea Ponds however.
Scarce Chaser - *Libellula fulva*
This is a rare dragonfly, found on about six river systems only, in Southern England. These include the Avon in Wiltshire and Somerset. It has a tendency to spread from the rivers to nearby lakes. It has been breeding on the River Avon, between Bath and Keynsham, since about 1990. A male and a female

appeared at Backwell Lake in early July 1999. The male had mating marks on the abdomen. We had two males present at the lakeside in June 2003.
Blue eyes and a dark triangle on the hind wing serve to distinguish the male *L. fulva* from the male *O. cancellatum*.

Common Darter - *Sympetrum striolatum*
Common Darters occur at the lake, 20 to 30 each year, between August and October. There have been times when the number has doubled for a day or two. There were 63 on 11/9/93, 76 on 15/10/94, and 60 on 25/9/96. It seems likely that what we were witnessing on these dates was in part due to an influx of passing migrants.
Identifying Darters is not always easy. On 19/9/02 we had a male with some longitudinal red veins, but that can happen with *S. striolatum*. A frontal photograph showed vertical black lines beside the eyes, which the Common Darter is not supposed to have, but the species does vary.

Ruddy Darter - *Sympetrum sanguineum*
These appeared here in 1993, having been previously known at Nailsea Ponds, since 1988. So now one has to look carefully to distinguish *S. sanguineum* from *S. striolatum* at the lake.

Yellow-winged Darter - *Sympetrum flaveolum*
In August 1995 there was an invasion of England and Wales by the Yellow-winged Darter - an unusual occurrence. Previous such events were in 1908 and 1926.
We had reports of it from 10 locations in North Somerset, from the Mendips to Gordano. One male was flying in Netcott's Meadow on 28th August.1995, and another (or perhaps the same one) in the same field on 1st September.

19 species are mentioned above. At least 5 of these could be considered as of non-local origin. Others may be presumed to be breeding at Backwell, though proof is hard to find. Neither in the lake shallows, nor on the plant stems that emerge there, do we find dragonfly larvae or exuviae. Hungry predators such as birds and fish, of which we have a multitude, probably account for this fact. Lesser water-bodies nearby do produce larvae and exuviae, though I have yet to find an exuvia of the Black-tailed Skimmer.

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Fish in the Frome

RL Bland, from data supplied by the Environment Agency

The Bristol Frome is a lively river. It springs forth from the Cotswolds scarp at Tormarton just under the A46 at ST 762790 at a height of 160 metres ASL. By the time it reaches Eastville Park and the Storm water Interceptor it is almost at sea level, and has travelled 20 km, a fall of about 8.0 metres a kilometre. All the way through Chipping Sodbury and Yate for nine kilometres it remains a tiny stream but just before Frampton Cotterell it is joined by the Lodden Brook, which drains a huge area as far north as Tytherinton and Wickwar, and at that point the Frome becomes a proper river large enough to hold interesting fish. At Hambrook it is joined by Bradley Brook which drains Filton and Patchway and Bradley Stoke, where it slips under the M4. Both these streams are somewhat polluted, the Lodden Brook with agricultural effluent, and Bradley Brook with motorway, domestic and industrial run off .

Its total catchment area is 123 square kilometres, which accounts for one of its key characteristics, flooding. The Frome effectively enters a five-kilometre gorge at Hambrook, and emerges from it at Eastville. It is a river that is about ten metres wide, and the gorge gives little room for a flood to spread out. When a centimetre of rain falls on the catchment area, and that is quite a common daily fall, as the average for the area is 15 mm a week, it creates 12.3 million cubic metres of water, which all eventually has to fit through that gorge. The Frome's output can increase tenfold in a few hours, and in times past periodic floods wrecked the centre of Bristol, and this is only prevented today by the Northern Storm water Interceptor, opened in 1964, that takes the floodwater from the Frome at a weir below Eastville, and diverts it in an underground pipe that comes out just under Seawalls in the Avon Gorge.

A further consequence of the rapid fall and large catchment is the excellent quality of the water in the Frome. It moves so fast and floods so often that any impurities that do come in, whether from motorway run-off or nitrates from fields or cattle slurry, are rapidly diluted, and rapidly removed from the system. Furthermore the presence of a substantial number of weirs, relics from 19th century industrial use, help keep the river oxygenated. It also has a number of normally shallow sections, where its fall is most rapid, that have the same effect. As it is so fast flowing there is less water vegetation to do this job

The environment agency regularly checks on the fish stocks in the Frome. The method is standardised, and uses electric stunning to capture the fish at precise locations. The fish are identified, weighed, and returned. The results give a measure of fish biodiversity and biomass. In 2003 there were five sites along the Frome itself, and one each on the Lodden and Bradley Brooks. The Five sites on

the Frome were at Colts Green, ST 739818, just east of Chipping Sodbury, where the Frome is still a tiny stream, capable of supporting small or juvenile fish only. The biomass was 811g/100m. The second site was Nibley, just west of Yate, at ST 690823, where the stream is a little larger and the fish are bigger. The catch missed a trout and probably a pike, and the biomass figure of 380g/100m is probably unrealistically low, as the fish were a good deal larger than at Colts Green.

The third site is Damsons Bridge, at ST 657 797, just outside Winterbourne Down, where it is a sizeable stream about five metres in width. It has by this time received the Lodden Brook, which drains the largest part of the total catchment, and this site was rated Very Good, the highest rating, with the highest biomass of 5109g/100m. This is higher than in 2002. The fourth site was at Frenchay Bridge at ST 641 772. This held fewer and smaller fish, but was still rated good. The biomass was 2082g/100m. The last site was Eastville Park at ST 618756. Here the catch was rated average only, the biomass was 1727g/100m and this was down from 2002. One reason for this decline in biomass over this stretch may be the angling pressure, but it is also fished by Cormorants, Herons and Kingfishers. There is very little water vegetation in this stretch, possibly because of disturbance from dogs, and the damage done by the frequent floods.

The two brooks were also sampled, Bradley Brook at ST 642 803 and Lodden Brook at Bows Bridge near Latteridge, ST 669843. Both are quite small streams, but both were rated poor, with very low biomass.

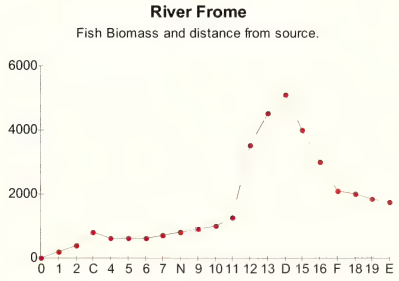

Chart showing estimates of fish biomass and distance from source. The figures are interpolations between the figures from the Environment Agency for Colt Green (C) Nibley (N) Damson Bridge (DB) Frenchay (F) and Eastville (E)

All sites provided reasonable numbers of small fish, that is Bullhead, Stone Loach, Minnow and Stickleback, though at Colts Green there were only small numbers of Bullhead. The numbers of these are not counted but they are weighed.

A total of 432 large fish were caught. 44% were Roach, the largest number at Damson Bridge. 20% were Eels, which made up almost half the catch at Frenchay. The largest was 56cm long, and weighed a pound. Chub formed 13% of the total. One weighed 3lb 6oz at Frenchay, and another 2lb 13oz at Damson Bridge. Pike formed a small proportion of the catch but one at Frenchay was 5lb 4oz. The Lodden Brook had two large Pike, which may account for the lack of other fish and a Pike was probably missed at Nibley. Brown Trout are present, with good numbers of small and medium sized fish at Colts Green and three good-sized specimens at Nibley.

Site	Colts gn	Nibley	Damson Br	Frenchay	Eastville
MR	739818	690823	657797	641772	618756
Distance.	3	8	14	17	20
Eel		2	2	11	72
Roach			108	34	50
Dace			6	1	22
Gudgeon			15	6	14
Chub			16	38	1
Pike		1		1	
Perch			10		
Bream			8		
Trout	10	3	1		
Bullhead	p	p	p	p	p
Stone Loach		p	p	p	p
Minnow		p	p	p	p
Stickleback			p	p	p
Catch	10	6	156	91	179
Biomass g	811	380	5110	2083	1728

Table 1 The fish caught at each of the sites on the Frome. Minor species are recorded as present only. The Biomass is in grams per square metre, and is a computer calculated estimate based on the number and weight of fish caught

Site	Bradley Br	Lodden Br	Frome	Species
MR	642803	669843	Total	Percent
Eel	2		87	20
Roach	3		192	44
Dace			29	7
Gudgeon			35	8
Chub			55	13
Pike		2	2	1
Perch			10	2
Bream			8	2
Trout			14	3
Bullhead		p		
Stone Loach		p		
Minnow		p		
Stickleback	p	p		
Catch	5	2	432	
Biomass g	2	652		

Table 2. The catch on the two brooks that flow into the Frome, and totals

Richard Bland

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North Somerset Levels and Moors Project

Elaine Weller

The North Somerset Levels and Moors Project aims to promote, protect and enhance the unique wildlife of the Levels and Moors.

So this is the idea, but how does the project work to achieve these aims? There are many different approaches being taken but the project is probably best known for its work with otters (*Lutra lutra*). Back in 1999, a sub-group of the project, the North Somerset Otter Group was set up to survey the rivers and rhynes in North Somerset for signs of this elusive mammal. Since then the otter group has grown from strength to strength, and currently 30 surveyors work the banks of main river and rhyne looking for spraint, footprints and other tell tale signs. The results are stored on a database and sent to Bristol Regional Environmental Records Centre. These have shown a steady increase in otter activity up to the present day, when we can say that all the main rivers in North Somerset are currently being utilised by otters.

Apart from surveying, the project also gets involved in habitat improvement and creation projects to benefit the otter. Holts have been built along river banks and trees planted to provide cover. Work is also underway to make road crossing safer with potential otter underpasses in the pipeline.

The project is far more than just otters however; water voles (*Arvicola terrestris amphibious*) have been taking up a large chunk of my work schedule in recent months. I have spent many days this summer searching for any remaining water vole colonies on the North Somerset Levels. Although there are thriving populations just south of the Mendip hills, no populations have yet been found in this area. Could this be solely due to mink predation? This is an ongoing discussion but one thing is for sure this creature, which was once a common site in our ditches and rivers is rapidly declining at a national level. The future for this project involves more surveying to ensure that we pick up any fragmented populations that may still be out there. We have not given up hope yet.

Each year the project takes on a university placement volunteer who spends a year assisting me with general day-to-day work (not that there is an ordinary day) and a project of their own. This year, Toni Vernelli from the University of East London is spending the year here and has made a flying start working with the otter group amongst other things. Toni will also be undertaking a water shrew (*Neomis fodiens*) survey during her stay with us, looking at habitat requirements and distribution across the levels. This species has not been studied on a large scale in this area before and this will form part of the mammal society's national survey.

Leaving the riparian mammals behind, the attention of the project has turned to birds. A call from a local RSPB member, Trevor Riddle highlighted the presence of a tree sparrow colony near Clevedon. With the help of a Biodiversity Grant from North Somerset Council, and Clevedon Naturalists we put 16 boxes up and to our delight at least one was used by tree sparrows. To further the project, local businesses are being contacted to help with food for the birds. Tree sparrows are another species in serious decline and this small group of birds is one of only two known colonies in North Somerset.

The people who really look after the landscape and allow us to carry out all of this important work, are the farmers and landowners on the levels. A significant part of the project is spent helping farmers with Agri-Environment Scheme applications and providing advice on management for wildlife. Without the co-operation and help of the landowners much of the work of the North Somerset Levels and Moors Project would not be possible.

Finally the project will shortly be launching the 'North Somerset Levels and Moors Wildlife Series' for 2004. This is a series of short courses in partnership with Goblin Combe Environment Centre in Cleeve. The mainly one-day courses will focus on wildlife associated with the Levels and Moors landscape and ecology of various groups including dragonflies and damselflies, grasshoppers and bush crickets, amphibians and mammals. There will also be a series of events throughout the summer focussing on the history of the landscape, introduction to wildlife and guided walks.

So there is a brief taster of my work as North Somerset Levels and Moors Biodiversity Officer. There are many opportunities for people and organisations to get involved in the project, so if you are interested in taking part please get in touch.

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The North Somerset Levels and Moors Project is a partnership involving Avon Wildlife Trust, English Nature, North Somerset Council, the Environment Agency and Bristol and Regional Environmental Records Centre.

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Prey preference of the woodlouse-eating spider (*Dysdera crocata*)

Rosemary Atkins

Previous experiments in the 1950's were carried out to see which species of woodlouse *Dysdera crocata* preferred to eat and whether or not it would take other invertebrates. Later research in 1995 indicated that *D. crocata* does not necessarily prefer woodlice to other species of invertebrate. Woodlice only were used in the experiments for this Paper which was undertaken to show that *D. crocata* preferred those species of woodlice with which it was most likely to come into contact. In order to assess the prey species preference, fifteen *D. crocata* were caught and each put in an individually labelled plastic box. To give the spiders a choice of prey one each of three different species of woodlouse, *Armadillidium vulgare, Oniscus asellus* and *Porcellio scaber* were also placed at the same time in the boxes with the spiders. Daily morning monitoring was carried out. The results showed that *A. vulgare* was not eaten, except in one instance, and no preference for *P. scaber* over *O. asellus* was determined.

Introduction

There is little current literature on the invertebrate prey preferences of *Dysdera crocata* C.L. Koch, apart from Pollard in 1986 and Pollard *et al* in 1995. Bristowe in the 1950's concluded that under laboratory conditions *D. crocata* did have a preference for a particular species of woodlouse, *Philoscia muscorum*, although in a *Comity of Spiders* (Vol. II, p.271) he admits that some spiders may refuse unfamiliar prey. As *D. crocata* shares the same habitat as woodlice its preference for them over other invertebrates such as moths, seems unsurprising. Many authors refer to *D. crocata* as the woodlouse-eating spider but none give an indication of the species eaten (Savory, 1928; Foelix 1982; Le Havre University 2003).

The suggestion presented in this paper is that *D. crocata* in its particular natural habitat may not necessarily have all species of woodlouse available to it, as some are found only in calcareous surroundings and others on coastal sites (Harding and Sutton 1987). Its choice of prey therefore will be limited to those in its immediate vicinity and it may well reject those species to which it has never been exposed.

Description of *D. crocata* (the predator)

D. crocata belongs to the *Dysderidae* family in the order *Labidognatha*. It is a distinctive spider with a red cephalothorax and legs and a pale grey abdomen that, unusually for *Araneae*, is not patterned (Fig. 1).

Fig. 1 Male *Dysdera crocota* (x 7) trapped in spi-pot

It has six eyes, which form a circle but do not give very good vision. Its most impressive feature are the chelicerae which are long, projecting, divergent and with impressive fangs (Fig 2.).

Fig. 2 Head of *D. crocata* showing chelicerae
(Taken from *The World of Spiders*, Bristowe, 1971)

The sexes are similar, the differences being in size with the adult female larger at 11 to 15mm and the male 9 to 10mm with a slimmer abdomen. The females have no epigyne, the modified external genitalia associated with reproduction and usually present in most species of female spider (Fig. 3).

Fig. 3 Ventral view of female *D. crocata* (x 4) showing absence of epigyne

It is capable of inflicting a nasty bite on humans (Hopkin, 2003), which may cause swelling of the joints and dizziness, symptoms that may last two to three days (Hillyard, 1994).

These spiders do not spin webs, but make a silk cocoon beneath their chosen shelter in which they rest (Fig. 4).

Fig. 4. Remains of silk cell made by *D. crocata* together with woodlouse carcasses

It is possible that these cocoons are also used as a refuge when they are moulting (ecdysis) (Roberts, 1995). On one occasion three cocoons were found close together. One of these contained a shed skin, a second had a spider emerging and the third contained a spider which later emerged leaving a shed skin behind. In

the pilot project a year earlier the spider was disturbed from its cocoon and spun a new one rather than returning to the old undamaged one.

They are generally found in habitats, which face north or east, frequently under stones, flowerpots or similar locations, where it is usually damp and cool and under which there is also an abundance of prey. Locket and Milledge, however, say they are to be found in situations that have been warmed by the sun (Locket & Milledge, Vol.1 p.85) but this author has found only one in a south-facing situation. Bristowe (*Comity of Spiders, p.272*) says they are to be found in abundance on the south and southwest coasts of England where their favourite species of woodlouse, *P. muscorum*, is also plentiful. However, the distribution map in *British Spiders* (Locket & Milledge, Vol. III) shows the spiders are widespread over England and parts of Wales.

Description of Woodlice (the prey)

The body is segmented into three parts, the head, the thorax or pereion made up of seven broad plates with seven pairs of legs and the abdomen or pleon which has four obvious plates, the last plate or telson is often triangular (Fig. 5). Woodlice colour varies (see Table 1) and the shells may have one half paler when they are moulting. The shells are permeable and if not covered with a thin film of moisture some woodlice will dessicate or suffocate rapidly, but *A. vulgare* by rolling into a ball reduces this effect. The tegumental glands, found within the pereion and pleon, secrete a distasteful and repellent fluid as protection against enemies. Sutton has suggested that younger woodlice are more susceptible to predation than older ones because the secretions are less powerful (Sutton, 1972).

Name	Size	Colour	Habitat	Distinguishing Features
Armadillidium vulgare **Common pill woodlouse**	18mm. rounded and domed	Slate grey	Lime rich areas, dry grasslands or old walls, buildings with crumbling mortar	Thicker shell, more waterproof but needs lime. Found in daytime. Well-developed pseudo-tracheae. Rear end blunt
Oniscus asellus **Common shiny woodlouse**	16x8mm. Wide, flattish	Brownish black, paler mottling, pale edges to plates. Shiny	Rotting wood, logs and stones	Telson long, pointed. Very abundant. Sits tight when disturbed. Flagellum 3 segments. No pleopodal lungs
Porcellio scaber **Common rough woodlouse**	16x<8mm. wide, narrower than *O. asellus*	Dark steel grey, some light mottling. Young yellow & brown. Rarely shiny	Stones, logs. Bark crevices	Telson triangular. Dorsal surface covered with prominent tubercles. Has pseudo-tracheae. Common. Flagellum 2 segments. Pleopodal lungs visible

Table 1 Identification of Woodlice species and their habitat

Woodlice prefer a habitat which is moist like bark crevices, dead leaves, in shrubs, walls, hedgerows, all sites offering them food and shelter. They may be more abundant in lime-rich soils as they need calcium for their shells. Their food preferences are for decaying material, animal dung and occasionally young seedlings. By eating detritus they speed up the decay and breakdown of rotting material, so returning nutrients to the soil (Sutton, 1972; Hopkin, 2003).

The characteristics of the three species that were offered to *D. crocata* in this research are as follows: -

A. vulgare is also known as the Pill Woodlouse from its habit of rolling into a ball to avoid dessication or give protection against predators. It is widespread, more commonly found in calcareous grassland or in gardens where lime mortar is available, and may vary in colour but slate grey is the most usual. It is not necessarily nocturnal and may be found wandering during the day, although not if it is windy as this makes it dry out more rapidly.

O. asellus, known as the Common Shiny Woodlouse, is the most widely distributed and common woodlouse both in range and habitat being able to tolerate acid conditions, providing they are moist, not dry. It is found under stones and particularly rotting wood and tends to clamp down on the soil rather than move away.

P. scaber or Common Rough Woodlouse, can be found in similar habitats and may be distinguished from *O. asellus* by the two pairs of white pleopodal lungs clearly visible close to the rear pair of legs, the different shape of the telson and the number of flagellae present (Fig. 5). It is also dull grey in colour but narrower in shape compared with *O. asellus* and runs as soon as it has been disturbed.

The main predators of all three species are Shrews, *Sorex araneus*, Toads, *Bufo bufo*, Ground Beetles, Carabidae, Centipedes, *Lithobius forficatus*, and *D. crocata*.

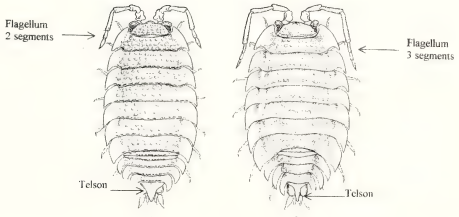

Fig 5. Dorsal views of (a) *P. scaber* and (b) *O. asellus* showing two distinguishing features (Taken from *Woodlice* by S.L. Sutton)

Habitat

The habitat where 13 of the spiders were found is illustrated in Fig. 6. It consists of old clay roofing tiles stacked in 24's at 451mm deep, the row measuring 1981mm long, the whole supported by a concrete wall. This habitat is shared by numerous woodlice, two other six-eyed spiders, *Oonops pulcher* and *Harpactea*, together with other unidentified species of spider, Slugs, *Limas maximus* and Garden Snails, *Arion ater*, *Helix aspersa*, Amphipods, three Common Newts, *Triturus vulgaris* and a Toad, *B. bufo*. A further two spiders were captured from beneath flowerpots.

Fig. 6 Habitat where most of the *D. crocata* were found

The tile stack faces north and only gets the sun very early in the morning from late May until mid July so that it remains generally cool and damp. It was noticeable that the smaller younger spiders were well separated, whereas the older mature male and female spiders had only two to three stacked tiles between them. One female with spiderlings was found and she was not captured. No *D. crocata* were found sharing the same habitat as *A. vulgare*.

Equipment used

Small plastic boxes were used with tight fitting lids, each having six pinholes in them to admit air and to decrease humidity. The boxes measured 160mm x 100mm x 40mm deep and each contained a portion of damp paper towel for the woodlice to hide under, together with a piece of roofing tile measuring approximately 60mm x 75mm to give shelter to *D. crocata*. Each box was identified using a letter of the alphabet.

A spi-pot measuring 60mm high x 80mm diameter tapering to 55mm was made from two transparent plastic cake cases as depicted in a *Field Guide to Spiders* (Roberts 1995). A 40mm diameter circle was cut from the bottom of one and cling film wrapped over the hole. A piece of 8mm thick polystyrene foam was stuck to the bottom of the other cup, trimmed to fit and a piece of graph paper with 1cm. squares outlined stuck to this. The pots combined enabled the researcher to first capture and then identify, using a 10x hand lens, the invertebrate without harming it and the graph paper gave some indication of the size of the species.

Using a transparent pot is essential to make sure the spider has been caught and that no legs have been trapped under the edge.

A pair of forceps for removing woodlouse carcasses from the boxes and a ruler to measure the bodies were also part of the equipment.

Charts for each individual box were produced recording date and size of each spider, the species of woodlouse introduced together with a column for results and comments.

Method

The initial attempt to set up this research using large 1kg sweet jars was found to be unsatisfactory because one spider tried to get out through the screw top and a second did escape through the flap that had been cut in one side. In addition it was felt that the temperature and humidity in these large jars did not replicate the spider's natural habitat.

Advice was sought as to a more suitable method of keeping *D. crocata* in captivity and it was suggested that smaller containers with damp kitchen paper to create a degree of humidity together with some form of shelter for the spiders would be nearer to their natural habitat. The spiders were then transferred to the smaller boxes described in the 'Equipment Used' section. This created a further problem in that *D. crocata* appears to prefer a drier atmosphere while the woodlice, apart from *A. vulgare* which can live in drier situations, like it damp. By leaving the damp towel and some rotting vegetation to one end of the box and the tile the other, both the spiders and woodlice were kept in reasonable conditions.

Not all the spiders were captured on the same day. Previous research (Bristowe, 1971; Sutton, 1972) had suggested a predation rate of a woodlouse a night and it was thought a small number of spiders would be sufficient to obtain a result. It was obvious after commencing the experiment that this was an optimistic assumption and so further *D. crocata* were caught.

On finding a spider, the top half of the spi-pot was placed over it preventing its escape and then a sheet of paper inserted between the ground and the spi-pot, trapping the spider on the paper. The spi-pot was turned over, the spider dropped on to the cling film and the bottom portion of the pot placed gently into the top half, imprisoning the spider between the graph paper and the cling film, but still allowing it to move around. To restrict movement for examination, measurement and photography, all that was needed was slight pressure to be applied to the bottom portion. Care was taken not to apply pressure when the spider was half under the cut out portion of the top spi-pot as this had sharp

edges. This method of capture was found to be more effective than using a pooter.

Once examined (and sexed if mature enough) the spider was transferred from the spi-pot to a pre-prepared individual plastic box. At the same time three woodlice, one of each species, *A. vulgare*, *O. asellus* and *P. scaber*, were also placed in the box with the spider and the lid applied firmly. The boxes were labelled A – M. As the spiders' natural habitat is generally dark a large cardboard box was placed over all the boxes. The charts for recording were placed nearby. The spiders ranged in size from 7mm to the largest a female at 15mm.

The boxes were not checked the first night to allow the spiders to settle, but thereafter the lids of the boxes were lifted morning and evening at approximately 12 hourly intervals to allow air in and decrease the humidity caused by the damp paper towel and the outside ambient high temperature. Recording was done in the morning as it was felt this would follow a natural period of spider and woodlouse activity.

It was noticed that sometimes when removing the carcasses of woodlice in the morning they had spider silk attached to them. Woodlouse remains were not taken out when the spider either appeared to be eating, or the corpse was too close to the spider or when it was felt that perhaps the spider had not finished the woodlouse because the carcass was still soft – the woodlouse remains generally being stiff and friable. On two of these occasions it was noted that more of the woodlouse had been eaten. At the time the woodlice carcasses were removed they were replaced with a similar species so that if a *P. scaber* had been eaten then this was replaced with another *P. scaber*.

On the evening of 1st August spider C was observed trying to "open" a rolled up *A. vulgare*. As only 4-5mm woodlice were in the box, one 8mm *O. asellus* and three *P. scaber* (7mm, 8mm, 9mm) were introduced and within a minute a *P. scaber* had been seized using one chelicera on the dorsal surface, the other on the ventral. Approximately 20 seconds later it had ceased moving and within two hours Spider C was observed eating another *P. scaber*. Recording the following morning, 2nd August revealed four woodlice had been consumed – one *O. asellus* and three *P. scaber* – a record! The *A. vulgare* had not been touched. Those eaten were replaced with one *O. asellus* and two *P. scaber* and one *P. scaber* was deliberately steered towards the spider sitting in its lightly spun cell. The spider touched it with its palps and then turned to face the opposite way.

The smaller spiders, those measuring between 6mm and 10mm, were given smaller 5mm woodlice as they did not seem able or were unwilling to tackle the

larger 8 – 9mm woodlice. The remaining *A. vulgare* survived until the end of the project.

On occasions newly hatched woodlice were found in the boxes but whether or not these were eaten is not known as they were too small to be identified or counted. They did not feature in the results.

Although not all the spiders were captured on the same day, once caught all of them were kept in the north-facing back-addition of the house under the same cardboard box, so that conditions were identical for all and temperature fluctuation was not regarded as having an influence on the results.

Results

A total of 15 spiders were caught, kept in captivity for a period ranging from three to thirty-one days. At the start of the research one spider escaped immediately without eating and was not included in the results and a second spider disappeared after three days having eaten an *O. asellus*. This result was included in the analysis. A further three died. Spider B died after 25 days and was included in the results but Spider L died hours after capture and was not included. Spider E1 seven days after capture ate an *A. vulgare* and appeared unwell the same day. Three days later it died, having not eaten in the interim, and no credible conclusions should be drawn from this observation. This spider, E1, was also included in the research.

On 24th June 2003 the daytime temperature started to rise and by 14th July the day temperature was 27°C, and the spiders did not eat. As the temperature cooled down so they became more active and by 24th July they were eating regularly. Daily morning recordings were taken of which species they had eaten and if possible the size. Measurement of the carcasses presented a slight problem because, apart from the bodies being eviscerated, sometimes either the head or tail or both would be missing or the remains were too small to be identified.

Just before releasing the spiders on 5th August a further period of high day and night temperatures (30°C dropping to 20°C) led to another fall in predation on the woodlice, the spiders spinning thick cocoons and staying in them.

In order to analyse these results and find out if *D. crocata* did have a preference for one woodlouse species over another the variables of time spent in captivity, the numbers and species of woodlice eaten had to be taken into account. As these involved counts and scores, rather than measures, non-parametric statistics were employed.

Because of the time variable, it was necessary to convert the numbers of woodlice eaten per day to an ordinal rank scale. The rate figure was achieved by dividing the number of a particular species eaten by the number of days spent in captivity by each spider. To obtain the rank figure the rate figures were placed in ascending order with each value being given a ranking and where there was more than one rate of the same value, the rank was averaged. For example because there are 19 zero rates, the average rank for this number is 10; the next rate after zero is 0.04 of which there are three, so takes the average rank of 21. Once all the rates had been converted to an ordinal rank scale then the Kruskal-Wallis test could be applied. (Table 2)

With 2 degrees of freedom the value tabulated of χ^2 -distribution of 9.21 is far less than the calculated value of 18.06 where $P < 0.001$. Therefore the Kruskal-Wallis test demonstrates a very significant difference between the consumption of *O. asellus* and *P. scaber* over *A. vulgare*.

Rejecting this overall null hypothesis further non-parametric *post hoc* tests (Zar, 1999) were undertaken to see if there were significant predation differences between the three species of woodlice. The test used was the Nemenyi test which is multi comparison and based on the nonparametric Tukey test. The standard error (SE) is calculated where n = number of samples, k = number of woodlice species and R = rank sums:
This further test accepts the hypothesis that *D. crocata* prefers *P. scaber* and *O. asellus* to *A. vulgare* (Table 3).

Discussion
When searching for *D. crocata* for this experiment the majority of spiders were found in an environment where *P. scaber* were in greater abundance than *O. asellus*. It was thought this difference would be shown in the predation rate and the raw data supported this view with 44 *P. scaber* being eaten compared to 20 *O. asellus*. However these numbers do not allow for the different periods of captivity which ranged from 3 to 33 days and this time variable had a considerable influence on the statistical results. It would have been preferable to have kept all the spiders in captivity for the same length of time, releasing individuals when they reached 33 days, the maximum time one spider was in captivity, but this was impracticable.

Another factor that may have influenced the numbers of woodlice eaten were the day and night time temperatures which for two periods during the experiment were very high. In *A Comity of Spiders* Bristowe suggests that where spiders are in conditions of low light and high humidity then they tend to slow down (p.141).

The suggestion that only one woodlouse a night might be eaten (Bristowe 1971; Sutton 1972) was confirmed by the spiders in this experiment, apart from Spider C which ate four.

Statistical analysis of the results, using the Kruskal-Wallis test, rejected the null hypothesis that *D. crocata* would prefer *A. vulgare* to *O. asellus* and *P. scaber* to a highly significant degree. Further *post hoc* tests confirmed the Kruskal-Wallis statistics but disappointingly failed to demonstrate that *P. scaber* was preferred to *O. asellus*, although the total numbers of each species eaten would have suggested otherwise. This was probably due to the variation in captivity time.

In undertaking the research for this Paper, efforts were made to replicate the spiders' natural habitat as far as possible. It is suggested this was successful as the behaviour exhibited by Spider C in rejecting prey when not hungry would be normal for a free-living spider. It would also appear that woodlice become prey only when *D. crocata* is hungry.

Previous research into the diet of *D. crocata* seems to have been conducted in laboratories. Bristowe kept his spider in a petri dish and offered five different species of woodlouse one of which, *Platyarthrus hoffmannseggi*, lives in or around ants' nests and is therefore unlikely to be normal prey for *D. crocata* (1971). Pollard *et al* (1995) offered their spiders a variety of invertebrates, including two woodlice, *A. vulgare* and *P. scaber*, but in conducting their experiments the spiders were kept in petri dishes in full light. Under these unnatural conditions the tests were inconclusive and their spiders showed no preference for either *A. vulgare* or *P. scaber*. Although their findings are at variance with the results of the experiments described in this Paper, it may be that their spiders shared the same habitat with these two particular species of woodlouse and were therefore familiar to the spiders as prey.

A recent paper suggests that results from such experiments may differ substantially from those obtained in the field (McKemey et al, 2003).

In the researcher's experience, knowledge and literature concerning *D. crocata* is relatively scarce. It would be interesting to create an artificial 'natural' environment outside, perhaps using one-way glass, in order to monitor the spider's life cycle, assess any competition and to what extent it is predated upon by the other invertebrates which share the same habitat. Whether *D. crocata* is territorial, does it search for its prey and how soon after hatching do spiderlings tackle woodlice are all aspects, which could be investigated further.

Conclusion

This experiment used 14 *D. crocata*, the majority taken from one habitat and took place over a maximum period of 33 days. The success of the attempt to

create a natural habitat by using small boxes with shelter for both spider and woodlice is reflected in the significant results.

The suggestion made in the Introduction that prey choice would be restricted to those with which the spider was familiar was borne out with *A. vulgare* being rejected while *P. scaber* and *O. asellus* were eaten. This suggestion was confirmed both by the Kruskal-Wallis and the *post hoc* Nemenyi tests that showed that *A. vulgare* was rejected by the majority of the spiders. This rejection was thought to be due to *A. vulgare* living in a drier habitat, 10m or more from the spiders and therefore a relatively unfamiliar prey. In addition, because this woodlouse rolls into a ball it presents a difficult surface for *D. crocata* to capture and hold.

Of the two species of woodlice with which the spiders were familiar, *O. asellus* and *P. scaber*, statistical analysis of the results showed no particular preference for either of them.

The fact that in this particular experiment *O. asellus* and *P. scaber* were consumed in preference to *A. vulgare* is not wholly surprising as the results were obtained from spiders found in a specific limited habitat where the former two species of woodlice were relatively abundant and the latter absent. *D. crocata* sharing habitats with other woodlouse species might well show other preferences, thus supporting the proposition that familiarity with the prey is the determining factor.

References

Bristowe, W.S. (1941) *A Comity of Spiders*. Vol I. The Ray Society, London.

Bristowe, W.S. (1941) *A Comity of Spiders*. Vol II. The Ray Society, London.

Bristowe, W.S. (1971) *The World of Spiders*, Collins, London

Chinery, Michael (1977) *The Natural History of the Garden*. Collins, London

Cloudsley-Thompson, J.L. (1977). *The Water and Temperature Relations of Woodlice*. Meadowfield Press Ltd. Shildon, Co. Durham.

Foelix, Rainer F. (1982). *Biology of Spiders*. Harvard University Press, Cambridge, Mass.

Fowler, Jim, Cohen, Lou & Jarvis Phil (1998) *Practical Statistics for Field Biology*. John Wiley & Sons, Chichester, U.K.

Gorvett, H. (1956). Tegumental Glands and Terrestrial Life in Woodlice. *Proc. Zoo. Soc.* London, 126, 291-314.

Harding, Paul T. and Sutton, Stephen L. (1985). *Woodlice in Britain and Ireland: Distribution and Habitat*. Institute of Terrestrial Ecology, Huntingdon.

Hillyard, Paul (1994). *The Book of the Spider*. Hutchinson, London

Hopkin, S. (2003) Woodlice, chiselbobs and sowbugs. *Brit. Wildlife* 14, 381-387

Jackson, Robert R. and Pollard, Simon D. (1982). The biology of Dysdera crocata (Araneae, Dysderidae): Intraspecific interactions. *J. Zool.* London 198,
Locket, G.H. and Millidge, A.F. (1951). *British Spiders*. Vol. I. The Ray Society, London.
Locket, G.H. and Millidge, A.F. (1951). *British Spiders*. Vol. III. The Ray Society, London.

McKemey, A.R., Symondson, W.O.C., and Glen, D.M. (2003). Predation and Prey Size choice by the carabid beetle *Pterostichus melanarius* (Coleoptera: carabidae): the dangers of extrapolating from laboratory to field. *Bulletin of Entomological Research* 93, 227-234.

Oliver, P.G. and Meechan, C.J. (1993). *Woodlice*. Field Studies Council, Shrewsbury.

Pollard, Simon D (1986) Prey Capture in *Dysdera crocata* (Araneae: Dysderidae) a long fanged spider. *New Zealand Journal of Zoology* 13 (1) 149-150.

Pollard, S.D., Jackson, R.R., van Olphen A. & Robertson M.W. (1995). Does *Dysdera crocata* (Araneae: Dysderidae) prefer woodlice as prey? *Ethology. Ecology & Evolution* 7 (3) 271-275.

Roberts, Michael J. (1985). *The Spiders of Great Britain and Ireland*. Vol I. Harley Books, Colchester, Essex.

Roberts, Michael J. (1995). *Collins Field Guide to Spiders of Britain and Northern Europe*. HarperCollins, London

Sutton, Stephen (1972) *Woodlice*. Pergamon Press, Oxford.

Sutton, Stephen, Harding, Paul, Burn, David (1972) *Key to British Woodlice*. Ginn & Co. London

Zar, Jerrold H. (1999) *Biostatistical Analysis*, (4th ed.) Prentice Hall, New Jersey

URL References

http://www.univ-lehavre.fr/cybernat/pages/dysdcroc.htm [Accessed 21 Mar 2003]

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Peter Smithers, Plymouth University.

Box	*A. vulgare*			*O. asellus*			*P. scaber*			Days captive	% days captive
	Eaten	Rate	Ranks	Eaten	Rate	Rank	Eaten	Rate	Rank		
A1	0	0	10.00	1	0.33	42.00	0	0	10.00	3	9.01
A2	0	0	10.00	1	0.04	21.00	5	0.21	39.00	24	72.73
B	0	0	10.00	2	0.08	26.00	6	0.25	41.00	24	72.73
C	0	0	10.00	1	0.04	21.00	7	0.21	39.00	**33**	100.00
D	0	0	10.00	0	0	10.00	5	0.17	36.00	30	90.91
E 1	1	0.09	28.50	0	0	10.00	1	0.09	28.50	11	33.33
E 2	0	0	10.00	0	0	10.00	2	0.13	31.00	15	45.45
F	0	0	10.00	2	0.07	23.50	4	0.13	31.00	30	90.91
G	0	0	10.00	0	0	10.00	2	0.07	23.50	28	84.85
H	0	0	10.00	0	0	10.00	3	0.13	31.00	23	69.70
I	0	0	10.00	5	0.21	39.00	4	0.17	36.00	24	72.73
J	0	0	10.00	4	0.17	36.00	2	0.08	26.00	24	72.73
K	0	0	10.00	2	0.08	26.00	1	0.04	21.00	24	72.73
M	0	0	10.00	2	0.14	33.50	2	0.14	35.50	14	42.42
Total	**1**		**158.50**	**20**		**318.00**	**44**		**428.50**	**Av21.93**	

Table 2. Kruskal-Wallis table of woodlice species eaten by *D. crocata*

n = number of samples. R = ranks.

n	14	14	14
N = 42			
R	158.50	318.00	428.50
R^2	25122.25	101124.00	183612.25
R^2/n	1794.45	7223.14	13115.16

$\sum (R^2/n) = 22132.75$ $\quad K = \sum (R^2/n) \times \frac{12}{N(N+1)} - 3(N+1)$

$K = \frac{22132.75 \times 12}{1806} - 129 = 18.06$ $\quad K = 18.06$

$$SE = \sqrt{\frac{n(nk)(nk+1)}{12}} = \sqrt{\frac{14(42)(43)}{12}} = \sqrt{2107} = 45$$

Samples ranked by ranked sums (i) 3(*Av*) 2(*Oa*) 1(*Ps*)

Rank sums (R_i) 158 318 428

Comparison (B vs A)	**Difference ($R_B - R_A$)**	**SE**	**q**	**q0.05,∞.3**	**Conclusion**
1 vs 3	428 – 158 = 270	45	6.00	3.314	Reject H_o *Ps* is preferred to *Av*
1 vs 2	428 – 318 = 110	45	2.44	3.314	Accept H_o *Ps* is not preferred to *Oa*
2 vs 3	318 – 158 = 160	45	3.55	3.314	Reject H_o *Oa* is preferred to *Av*

Table 3 Conclusions derived from the Nemenyi test

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The life cycle of the Shining Ram's-horn Snail (*Segmentina nitida*)

Pat Hill-Cottingham

Introduction

Management of a habitat for the conservation of a particular species is impossible without knowledge of the life cycle and habitat requirements of that species. To obtain this data by observations in situ is only possible with highly sophisticated equipment, beyond the means of most ecologists. Because of this, experiments have to be carried out in the laboratory where natural conditions cannot entirely be achieved.

The species in this case was *Segmentina nitida* Shining Ram's-horn, a shiny, amber coloured Planorbiid snail, reaching a maximum size of about 6 mm in diameter, living in highly vegetated slow flowing freshwater ditches. It is extremely rare, designated RDB1 (Red Data Book - endangered, Bratton 1991) and all its other sites are in the eastern half of England - in East Sussex, Kent, Norfolk and Suffolk. It is a species included on the Priority List of Invertebrates under the Agenda 21 Biodiversity Action Plan scheme and a national Species Action Plan has been written for it. In Somerset, in its one ditch it is abundant, indicating it may well be a relict species, a conclusion borne out by the presence of fossil specimens discovered on Moors the other side of the Polden Hills.

In the study of the Somerset population, it was decided to carry out two main experiments to supplement the field work on population size and distribution, namely:
observations of breeding in captive populations in laboratory tanks
observations of growth in outdoor tanks
It was hoped that the former would deliver information on the details of the life cycle whilst the latter would demonstrate rate of growth in a simulated natural environment with the operation of seasonal temperature changes.

However, as will be seen in the following account, things are never as straightforward as one hopes!

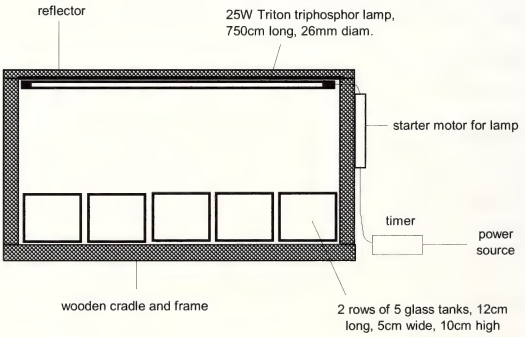
Aquarium studies 1: Breeding experiment

Methods

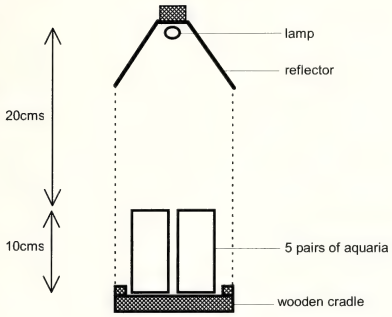
Figure 1 illustrates the apparatus built to house ten glass mini-aquaria. *Segmentina nitida* in the tanks were provided with *Lemna trisulca,* already confirmed as a food source, and artificial lighting from a 750 cm long 26 mm diameter Triton triphosphor lamp. This was designed to give constant light output (+90%), supplied for 14 hours per day a) to keep the plants growing and b) to simulate spring conditions and encourage breeding of the snails. The cradle holding the tanks had a low safety rim around the outside and was of a size to allow two rows of five tanks giving replicates for analysis. Each tank was 12 cm long, 5 cm wide and 10 cm high. This size was decided upon to enable small snails to be seen readily amongst the plants and also to allow ease of rotation and ensure similar conditions to each tank over time.

Figure 1 Apparatus housing aquaria, with diagrams of a) side and b) cross-sectional views

a)


reflector
25W Triton triphosphor lamp, 750cm long, 26mm diam.
starter motor for lamp
timer
power source
wooden cradle and frame
2 rows of 5 glass tanks, 12cm long, 5cm wide, 10cm high

b)



Experimental set-up

On January 7 2001, a sample was collected from the ditch and adult specimens of *S. nitida* extracted.
Each tank in the first set of five was set up as follows:
tanks 1 and 2 with single adult snail at least 4 mm across
tanks 3 and 4 with a pair of adult snails
tank 5 with four adult snails
Tanks 1a - 5a, the second set, contained replicates of the above.

Tanks were rotated weekly to provide uniform conditions. The contents of each tank were examined at intervals and numbers recorded.

It was extremely difficult to maintain the water at a sufficiently low temperature, as during the day it would climb as high as 20° C, and at night from 18°C. down to 16°C. This probably accounts for the high levels of mortality especially on April 30 when the temperature rose above 20° C for several hours and the experiment had to be terminated. Surviving animals were returned to the ditch. It should be noted that *S. nitida;* however, can survive a range of temperature (3 - 22°C in the ditch).

Results

Results are shown in Table 1.

Table 1 Breeding experiment, numbers of adults and young recorded (d = died)

	4.3.01		25.3.01		30.4.01	
tank	no. adults	no. young	no. adults	no. young	no. adults	no. young
1	1	0	1	4	d	2
1A	1	22	1	d	d	d
2	1	7	1	7	1	2
2A	1	10	1	14	d	1
3	2	22	d	6	d	d
3A	2	3	d	d	d	d
4	2	11	d	8	1	d
4A	2	38	d	4	d	3

At the end of April, remaining live animals were returned to the ditch.

Conclusions

From the data it can be deduced that:
The species is hermaphrodite since single individuals produced young after several weeks
Variable numbers of young are produced
Growth is slow (0.3 mm was the maximum increase in diameter in four months) and therefore it is possible that the species lives for more than one year but probably less than two years
There is high mortality with overcrowding and with increased water temperature - probably the latter is the crucial factor and caused the deaths in this experiment.

Single animals were isolated for several weeks before breeding, which poses one important question - when does exchange of sperm take place? Is self-fertilisation possible?

Aquarium studies 2: Outdoor longevity and growth experiment

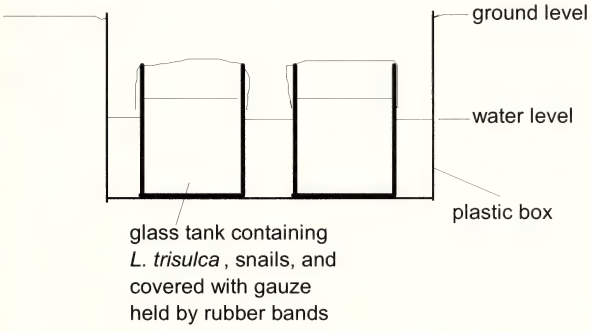
Method

To determine the length of life of *S. nitida*, specimens had to be kept outdoors in conditions as natural as possible whilst making regular examination possible and avoiding predation.

In January 2002, a plastic box (300 x 250cm) was set into a hole dug in a lawn and partially filled with rain water to help maintain a temperature approximating to that of a larger water body. Four small glass tanks (13 tall x 9 x 7 cm) were placed in the box, so that the height of each mini-tank was below the height of the box, and set up as follows:
tank 1 contained ten snails of size 1.0-1.9 mm maximum diameter
tank 2 ten snails of 2.0-2.9 mm
tank 3 ten snails of 3.0-3.9 mm
tank 4 ten snails of 4.0-4.9 mm

All tanks were given a supply of *L. trisulca* with ditch water, previously examined to ensure no leeches or other invertebrate species were present. The tops of each tank were covered in fine gauze held by two elastic bands and the plastic box also partially filled with rain water to simulate ditch conditions. The snails were measured and the mean diameter in each tank calculated. (Figure 2)

Figure 2 Apparatus used in longevity experiment



It was thought that the tanks would be kept topped up by rain water as the plastic box filled with rain and that the tanks should be examined every three months, snails measured and the mean diameter of snails in each tank recorded, enabling calculations of rate of growth.

Examination in March 2002

Following rain, the tanks had all become filled with water to the height of the net covers.

From all the tanks, specimens had managed to escape over the edge of the tank, even negotiating the elastic bands and entering the plastic box. In all only 28 of the original 40 could be found (no empty shells) and it was impossible to know from which tank they originated. However, all were measured and returned to the tanks to test a modification of the apparatus, described below.

In normal conditions the snail emerges out of the water and crawls a few centimetres up the stems of emergents. Because of this, it was decided to check the height of the water in the tanks after rain and pour off the surplus to leave an air gap of 3 cm between the water surface and the net covers. If this stopped the snails escaping, a new set of snails would be set up and the experiment started again. However, in spite of these precautions, snails escaped again and the issue was complicated by the numbers of young ones that had been born. With time limitations, it was decided to abandon this experiment. In spite of the disappointment, the fact that the snails could extricate themselves from the tanks implies an ability to negotiate obstacles. Originally, in 1998, one specimen had been found in a feeder ditch. This behaviour would imply that colonisation of the ditch through the 2 m pipe and flap valve from the feeder ditch would offer no problems to the snail.

Discussion

The maxim, 'never work with children or animals' should be extended to include invertebrate animals as well! The outdoor longevity experiment caused the most frustration. It was almost impossible to believe that such delicately shelled snails could infiltrate between glass and gauze held by a succession of two tightly stretched rubber bands, but they did. It was very annoying not to be able to keep snails captive outdoors long enough to measure rate of growth and longevity. Further experiments will require a more sophisticated approach; however, they should be conducted outdoors if conditions in the aquaria are to represent the environment the snail normally experiences. The practical

difficulties found were mainly due to the fact that the species is ovoviviparous. With an egg-laying species the eggs could have been removed from the tanks, ensuring that all individuals measured were there from the start and enabling the identification of a single cohort for a more accurate examination of population dynamics. The fact that the population was replenished with young together with the ease with which they escaped meant that the original population could not be easily identified. A future solution may be to mark the shells in some way but the extreme glossiness of the surface and small size would make this difficult.

In spite of all the problems, the results obtained from these experiments were correlated with results from the field surveys which had highlighted the importance of a late succession ditch, highly vegetated with emergents, the presence of *Lemna trisulca* as a food source and minimal disturbance, as habitat requirements for management of the ditches. The resulting management strategy is now being implemented by Somerset Wildlife Trust. In addition, a local Species Action Plan, based on this research, has been submitted to Sedgemoor District Council.

There is a great need for autecological studies, that is studies on the ecology of individual species, to give conservation bodies a scientific rationale for management strategies. It is something any naturalist can undertake.

Pat Hill-Cottingham BsC, PGCE, FPSCE, CBiol, MIBiol

Reference

Bratton J (1991) *British Red Data Books 3 Invertebrates*. JNCC

Acknowledgements

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Weather report for 2003

R.L.Bland

From 1920 - 2002 weather data was recorded at Long Ashton Research Station, and all the long-term figures below use that data. As that station closed at the end of 2002, the data for 2003 have been taken from the daily figures supplied to the Times newspaper for Bristol, and they may not be exactly compatible with the previous series. I believe that the differences are too small to be of significance. 2003 was remarkable for an exceptional summer, the months June to September having an average daily maximum of over 20.0ºC, and for being exceptionally dry, with a grand total of 758mm of rain, the least since 1973. It was also the third warmest year overall since 1920, with an average maximum temperature of 15.0ºC, just below 1949 and 1959. The decadal average figure reached 14.2ºC, back to the level of 1953. These conditions had a number of effects on wildlife that are commented on below.

Annual Temperature.

The annual mean maximum temperature was 15.0ºC. Graph 1 shows the figures for the past decade, and, and the decadal trend line, in which each point is the average of the previous decade. The overall mean since 1920 is 13.8ºC.

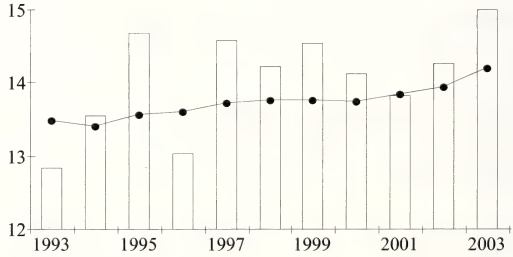
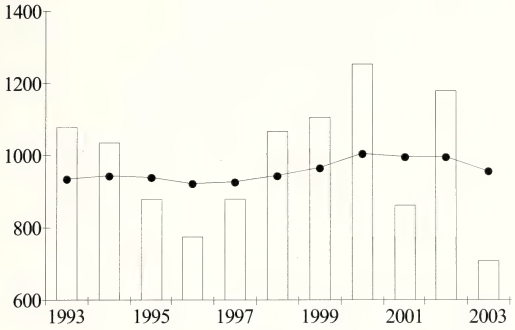


Chart 1. Annual mean maximum temperature for past decade. The line shows the decadal trend.

Annual rainfall.

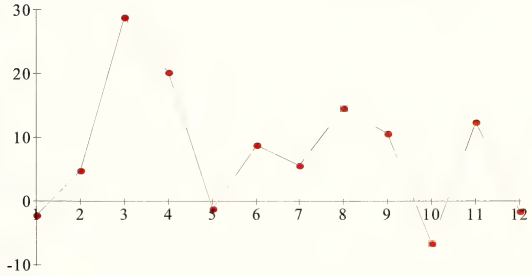
Graph 2 shows the rainfall for the past decade, and the decadal trend line. The annual average since 1920 is 906mm, whereas the figure for the past ten years is 958mm, because of the exceptional rainfall in 2000. The rainfall of 758mm in 2003 is 16% below average, but there have been ten drier years since 1920.



Graph 2 Annual rainfall in mm and the decadal trend.

Monthly Temperature

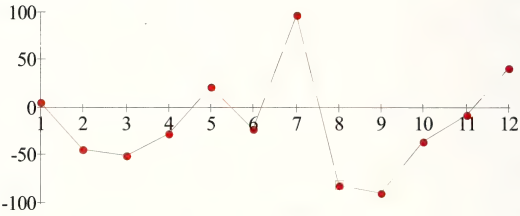
Nine months were above average temperature and only three below. In terms of percentage difference from average, March showed the greatest deviation, being 29% warmer, and April was 20% warmer. May was just colder than average, and the hot summer months, glorious as they were, were all less than 15% warmer than normal. Graph 3 shows the differences as percentages. The actual values can be seen in Table 1 below.



Graph 3 Percentage difference between monthly mean maximum temperatures in 2003 and the 1920-2002 average.

Monthly rainfall

Eight months had below average rainfall, and four were above. July, with 139mm, had more than double its normal amount, which did a great deal to ensure that the effects of the subsequent period of drought were less severe than they might have been. December was the second wettest month



Graph 4 Percentage difference between monthly rainfall in 2003 and the average 1920-2002

Of the dry months August and September were the most notable recording a mere 24mm. During March there was a 26 day spell with no rain, in August there were 26 days in which only 2mm fell, and in September 22 days with only 3mm.

Monthly summary

For each month the average maximum temperature and the total rainfall in mm is given followed in brackets by the average of each since 1920.

January Temp 7.3°C, (7.5°). Rain 92mm (88). 10 frost nights, nine in a row at start and one on the last day. The coldest night was -4°C. The month began with ridge of high pressure from Russia bringing easterly winds and cold dry conditions, much of Chew Lake iced up. On 13th westerly winds took over, and temperature rose to around 11°C until 28th when an Azores high caused north winds giving cold bright conditions.

February Temp 8.1°C, (7.7°) Rain 36mm (64), and none after 12th. 10 frost nights and ice from 14-20th. Coldest day 13th and 16th at 2°C. Warmest 13°C from 23rd on. Dominated by Russian high from 12th to end of month. The whole winter (Dec-Feb) mean max was 7.8°C, which is the average since 1920.

March 2003. Temp 13.2ºC (10.2ºC). Rain 29mm (60). Exceptionally sunny, seven days having more than ten hours. Very dry, no rain at all after 8th. Only 7 frosty nights. Temperature max 18ºC on 23rd. Dominated by high pressure from Russia and E winds. The warmest March since 1957.

April Temp 15.4ºC (12.8º) Rain 42mm (58). Max 26ºC on 16th. Only 5 frosty nights. No rain between 2nd and 23rd. Dominated by high pressure over Baltic, and northerly, easterly or SE winds. Southerlies round low pressure from 26th assisted a late migrant passage.

May Temp 16ºC (16.2º) Rain 77mm (64). Min 12ºC on 16th and max| 25ºC on 29th. Dominated by a rapid succession of low-pressure systems until 26th, when the month ended with a heat wave. Some single brooded bird species suffered.

June Temp 20.9ºC (19.2º), the hottest June since 1976. Rain 46 mm (60) Max 27ºC on 22nd. High pressure over Europe brought light warm west winds for most of the month.

July Temp 22.0ºC (20.8º) Rain 139mm (70), the wettest since 1968. First half dominated by Azores high, with max 32ºC on 15th, then a series of fronts swept the country, bringing 35mm of rain on 25th Temp min 18ºC on 29th.

August. Temp 23.6ºC (20.6º), the sixth warmest since 1920. Rain 16mm (84) the fourth driest August since 1920. Dominated by high pressure and light winds. At first high in Europe and low in Iceland, at end high in Atlantic and low in Europe. Hottest weather came with E winds peaking on 5th with 31ºC and 9th with 30ºC. Only rained on three days.

September Temp 20.1ºC (18.2º) Rain 8mm (82). Dominated by high pressure, and even when lows drifted across Iceland, very little on their fronts. Mostly very light winds, rain on three days only. The fourth month above 20ºC.

October Temp 13.5ºC (14.5º) Rain 58mm (92) 43 mm in last four days, ending a three-month drought. Max 20ºC on 11th, Min 6ºC on 22nd. 8 frost nights. Dominated by NE or E winds based on high pressure in Baltic or Iceland. Average temperature fell sharply from 17th.

November. Temp 11.7ºC (10.4ºC). Rain 80mm (97) Weather controlled by Icelandic lows. One storm on Friday 14th, but no damage. Only three frosts

December. Temp 8.0ºC (8.1º), rain 127 (90mm). 45mm fell on 13th, the wettest day of year. Max 13ºC on 12th, Min 2ºC on 8th. 8 frost nights Weather a variation of troughs and ridges.

	Max	1920-2002	Diff	Total rain	1920-2002	Diff
	C	C	%	MM	MM	%
January	7.3	7.5	-3	92	88	5
February	8.1	7.7	5	36	64	-44
March	13.2	10.2	30	29	60	-52
April	15.4	12.8	20	42	58	-28
May	16.0	16.2	-1	77	64	20
June	20.9	19.2	9	46	60	-23
July	22.0	20.8	6	139	70	99
August	23.6	20.6	15	16	84	-82
September	20.1	18.2	10	8	82	-90
October	13.5	14.5	-7	58	92	-37
November	11.6	10.4	11	89	97	-8
December	8.0	8.1	-1	126	90	40
Year 2003	15	13.8	9	758	908	-17

Table 1 Monthly mean maximum and rainfall figures compared with the average monthly figures 1920-2002, and the percentage differences.

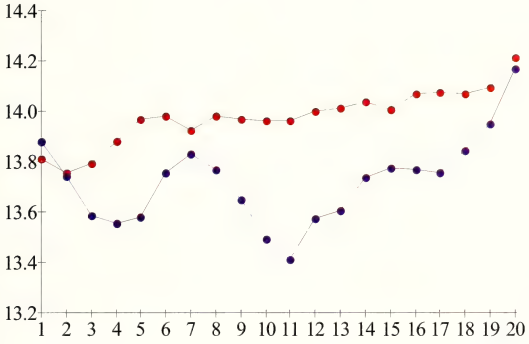
Some weather extremes of 2003

Wettest day	13th Dec 45mm
Hottest day	15th July 32°C
Coldest day	7th, 8th Jan 1°C
Sunniest day	21 June 15.1hrs
Longest cold spell	4th-12th Jan 9 successive frost nights.
Longest dry spell	March 8th-31, 24 rainless days.
Longest wet spell	May 16-22, 7 days.
Frost nights, total	49 nights
Days snow laying	None

Comment.

Global warming? Evidence from the past suggests that climate changes constantly, and in complex ways. The precise causes of these changes in terms of the many cycles which affect the temperature of the atmosphere and oceans is as yet unclear. The Solar sunspot cycle, which is roughly eleven years long, is a well-known one, as is the much longer-term variation in the earth's orbit around the sun. Recent attention has been paid to the proportion of carbon dioxide in the atmosphere, which has been increasing steadily since observations began in 1850. This change however does not correlate with any consistent change in

temperature measurements, and carbon dioxide is not the only gas, which creates a greenhouse effect. There is a tendency for those discussing global warming to make use of national figures, which are compiled by averaging a mass of regional data. The figures for Bristol since 1920 are perhaps more precise. In 2003 the decadal annual average maximum temperature reached 14.2ºC, 0.4ºC above the average since 1920 of 13.8ºC. However that figure was last reached in 1949, and Graph 5 below shows the decadal trend figures for the preceding twenty years, 1929-1949 and 1983-2003.



Graph 5 Decadal annual mean maximum temperature trend lines in C; red line 1929-49, blue line 1983-2003

Both series start at the same figure of 13.8ºC, which is also the average since 1920. However there was a very consistent rise from 1929-1949, which is in marked contrast with the past twenty years. They saw first, a fall to 13.4ºC in 1994, which was the lowest trend point since 1920, then an abrupt rise, which has caused so much comment. It is worth noting that the trend after 1950 was back to cooler years.

The impact of a drought.

The total rainfall in the previous twelve months has fallen throughout 2003 from 1100mm at the start of the year to 758mm by the end. Every month except July and December had less rain than its equivalent the previous year. This was accompanied by four very hot months from June to September. There were also 16 successive days in February with no rain, 26 in March, 22 in April; and 26 in August and 22 in September with virtually no rain.

The results were complex. Fruit ripened early. The average difference from 2002 of 18 species was nine days earlier. Even more dramatic was the onset of leaf colour change in trees. This was only recorded for eight species in the two years but the average difference was 34 days earlier. The whole autumn period was very drawn out, and the colour was dramatic at the end, but despite leaves falling unusually early in many species, trees only became bare an average of four days earlier. This was partly because in 2002 many trees were stripped early by a storm.

It was also an exceptional harvest for many species, including Ash, Maple, Apples, Sloes and other plums, and it was better than normal for native acorns. However there was no Whitebeam or Beech fruit at all, as there had been no flowers.

The effect on flowering plants was more complex because of the heavy rain in the second half of July. Many species ended their flowering period early. In 2002 mid-July was the peak of the flowering season with 64 species in flower on Clifton Downs. In 2003 there were only 51 species still in flower at that point. The impact of the rain in the second half of July halted the decline, so that the number of species was more or less identical from early September. Some late-flowering species flourished in the conditions, extending their flowering season. This was true of Hemp Agrimony, Vervain, Spear Thistle, Marjoram, Harebell and Fennel.

Farmers harvested early, and sowed autumn cereals, which germinated slowly, and thinly. There may thus be a bad cereal harvest next year as a result of this drought.

For breeding birds, those that bred late, or were multi-brooded, did well after May, but those, like Starlings and Tits, who relied on a single early brood did badly. It is not yet clear what the impact of drought was on fledgling survival, though there are some indications that dry soil, and hence the absence of soil invertebrates, may have caused heavy losses. Next year's BBS figures will give an indication. Certainly both Blackbird and Starling numbers in the autumn were well below normal.

It was an exceptional year for butterflies, both in terms of numbers, and the late dates at which species were still to be seen.

One other interesting response was that my daffodils were ten days late coming through my lawn, which was presumably a consequence of the lack of rain to stimulate the bulbs in September.

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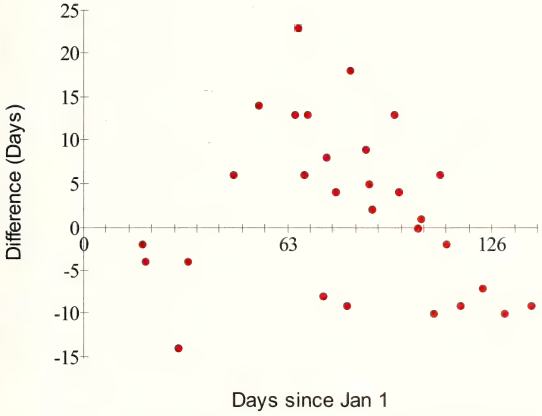
Phenology 2003

R.L.Bland

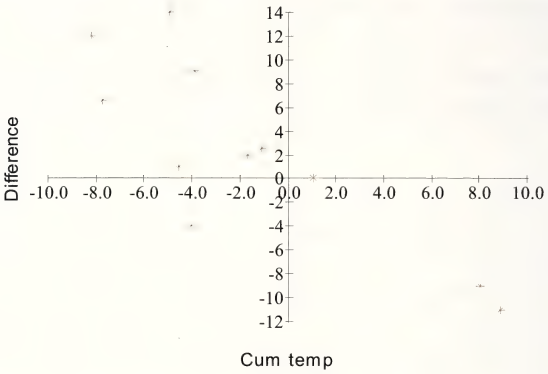
2003 was an exceptionally warm and dry year, and the pattern of events was rather different to 2002. There had been an unusually warm last two weeks of December, and many of the first spring events were early, but January and February had cold snaps, which slowed the process sharply, so that by the end of February events were late. March was an unusually warm month, and by the end of it many events were back on track, and April was also warmer than average, so that by early May events were happening earlier than usual. Graph 1 (4) shows the difference of a series of spring events from average set against the number of days since Jan 1st.



Graph 1. Relationship of the date to the difference from average of events in Spring 2003.

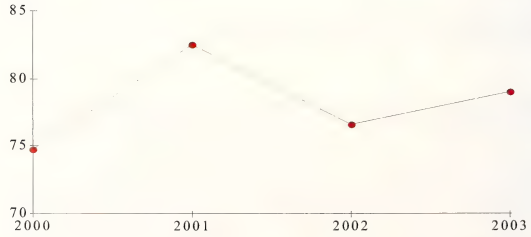
There appears to be a relationship between the cumulative difference in temperature from average, measured on a weekly basis from January 1st, and the number of days early or late that a spring event occurs. This is demonstrated in Graph 2. The horizontal line shows the 2003 cumulative temperature weekly difference from the average and the vertical axis shows the number of days earlier or later than the recent average that the event took place. Where there are more than one event occurs in a week, the average value is taken. Roughly

speaking a degree difference in cumulative temperature makes a day's difference in the timing of the spring event. However this graph has been based on just 22 events, which have been accurately recorded during the past six years, and some species seem to react much more sharply to temperature changes than others.



Graph 2 Relationship between the difference of events from average and the cumulative difference in temperature from average since Jan 1.

A simple method of comparing 2003 with recent years is to compare the dates of 19 events listed below during the period January to May. Their average date 1998-2002 was 18 March but in 2003 it was 20 March. Graph 3 shows the average date of these 19 events for the past four years, suggesting how relatively early or late the springs were. Table 1 shows the events and their dates.

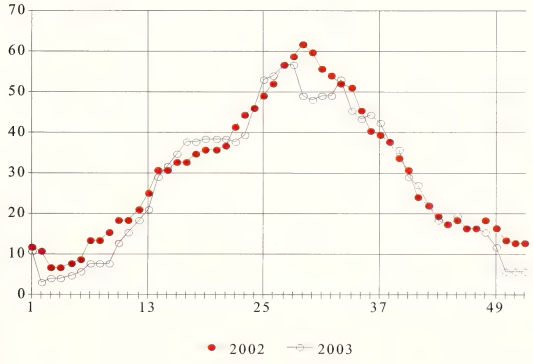


Graph 3 The average date in Julian days in Clifton of nineteen spring events 2000-2003

	Avg 1998-2002	2003	Difference Days
Snow drop flower	18/01	19/01	1
Hazel catkins flower	19/01	19/01	0
Chaffinch full song	31/01	06/02	6
Frogspawn	09/02	23/02	14
Celandine flower	03/02	15/02	12
Horse Chestnut bud-break	03/04	10/03	5
Alexanders flower	26/02	10/03	12
Blackthorn flower	08/03	16/03	8
Ash Flower	19/03	15/03	-4
Wild cherry flower	28/03	30/03	2
Bay flower	04/04	06/04	2
Honesty flower	07/04	10/03	3
Cow Parsley flower	11/04	20/04	9
Horse chestnut flower	13/04	13/04	0
Hawthorn flower	11/04	20/04	9
Sycamore flower	14/04	06/04	-8
Ash bud-break	24/04	13/04	-11
Ox-eye daisy flower	05/05	26/04	-9
Elder flower	18/05	26/04	-22
Avg of 20 spring events	17/03	20/03	29

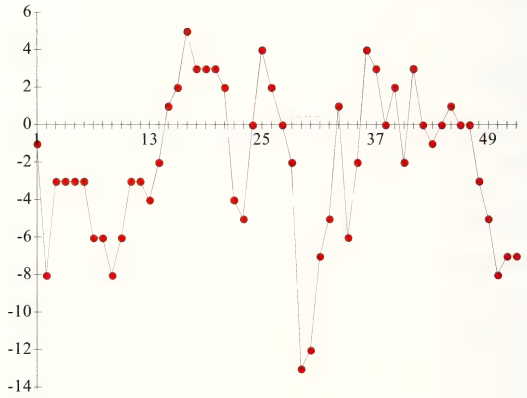
Table 1 Differences between 19 events in 2003 and average

The Table shows that most events were close to average, but Frogspawn, Alexanders and Celandine were late and Elderflower was spectacularly early.



Graph 4 Shows the weekly percentage of 105 species in flower on Clifton Down in 2002 and 2003

Graph 4 shows the impact of the cold weather in January and February. There was a rush into bloom in March so that by early April (week 15) more species were in bloom than in 2002. The cold weather in May slowed the onset of summer, but by week 26, the end of June, the two years looked alike. However in 2003 the season peaked in the first week of July, a fortnight earlier than in 2002, and the hot dry weather of the first two July weeks saw a rapid fall in species flowering. From week 33 on the fall in the number of species was almost identical, but in the last five weeks fewer species were still in flower in 2003. These differences are illustrated in Graph 5



Graph 5 The difference in the number of species in flower on Clifton Downs in each week of 2003 compared with 2002.

On the Clifton Downs the average flowering period of 53 species in 2003 was 14.2 weeks compared with 15.1 in 2002 and 12.2 in 2001. This figures shows the impact both of early and late springs, and early or late completion of flowering, and for some species, such as Wallflower, Hogweed, and Herb Robert, includes long overwinter flowering periods in some years.

Autumn

The four months of June, July, August and September had an average daily maximum of 21.7C, an exceptional figure, and were also very dry except for the last fortnight of July. As a result almost all autumnal events occurred early. Fruit ripened early, and then many leaves began to turn early as there was no rainfall, though the whole process was longer than usual, and some of the autumn colour was magnificent. Many trees kept their leaves longer than last year, as there was no major storm to remove them. Table 2 below also shows this process, though autumn events are less easy to date accurately than spring ones.

	2001	2002	2003	Difference
Blackberry ripe	07/07	21/07	20/07	6
Sloe ripe	19/08	18/08	03/08	-16
Elderberry ripe	05/08	11/08	03/08	-5
Ash ripe	01/09	15/09	17/08	-22
Yew berry ripe	28/08	18/08	10/08	-13
Ivy flower	31/08	01/09	31/08	-8
Holly ripe	16/09	22/09	13/09	-6
Gorse flower	23/09	08/09	13/09	-3
Ash bare	11/11	27/10	19/10	-15
Lime bare	18/11	27/10	12/10	-26
Beech bare	25/11	27/10	08/11	-2
Last wasp	24/11	14/11	15/11	-4
Ivy ripe	09/12	24/11	06/12	9
Oak bare	09/12	14/12	16/11	-25
Avg	02/10	28/09	22/09	-9

Table 2 The dates of 14 autumn events, and the difference that 2003 dates were from the average of the two previous years.

Survival

Some late flowering species continue into the new year, usually finally disappearing in January. Their survival depends on December's weather. In the four years since 2000 nineteen species have been found in flower on December 31st, but the maximum in any one year is 13, and only six species have been in flower every year. Table 3 lists the results. There appears to be no relationship between the number of species and the average December temperature, though observation in the first year may have been poor. Often there are only one or

two hardy or sheltered specimens of the species in flower, but it is also true that further south and west such species often survive well. Hence their survival here is an appropriate measure of what is possible for the species. Over time this study should provide some interesting results.

	2000	2001	2002	2003
Adria Bellflower	y	y	y	y
Blackberry			y	
Daisy	y	y	y	y
Dandelion		y		y
Gorse	y	y	y	y
Groundsel	y	y	y	y
Herb Robert	y			
Hogweed			y	
Ivy	y		y	y
Ivy-leaved Toadflax	y	y	y	y
Oxford Ragwort		y		
Red Nettle		y		
Red Valerian		y	y	y
Shepherds Purse				y
Smooth Sowthistle		y	y	y
Trailing Bellflower		y	y	y
Wallflower		y		
Yarrow				y
Yellow Fumitory	y	y	y	y
Total	8	13	12	13
December C	9.1	6.4	8	8

Table 3 Species in flower on December 31st on Clifton Down. Mean maximum December temperature is included.

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Bristol Botany in 2003

Professor A.J. Willis

The year 2003 was notably warm and dry. With the closure of Long Ashton Research Station, weather records from the station site are no longer available. Data used in the 'Weather Report for 2003' by R.L. Bland in this issue are taken from The Times newspaper as given for Bristol. These records give a total of 758 mm for annual rainfall, some 12.5% below the Long Ashton long-term average. Annual rainfall for Long Ashton has been higher than this value in every year since 1978 (when it was 735 mm). July and December were extremely wet months, but August and September very dry. The average maximum temperature for the year was 15°C, about 1.3°C above average, March and April being very warm months as well as August. The highest temperature reached was 32°C on 15 July.

With the rather cold start to the year, the vernal flora was not as early as in several recent years. Although a few blooms of *Helleborus foetidus* (Stinking Hellebore) were open on Churchill Batch on New Year's Day, it was not until late February that it was at its best, when *H. viridis* (Green Hellebore) was opening on Lyncombe Hill, in Upper Langford and Blaise Castle Woods. At the beginning of March the flora on Mendip was late, with *Hornungia petraea* (Hutchinsia) and *Erophila verna* (Common Whitlow-grass) some way off flowering whereas they are often in good flower in February or even earlier. At the end of March there were more than sixty flowering stems of *Gagea lutea* (Yellow Star-of-Bethlehem) at Stoke St Michael, but only a single one in Littleton Wood. It was a good year for *Himantoglossum hircinum* (Lizard Orchid) at Berrow, with over two hundred rosettes and some fifty flowering spikes (all records RSC). Large numbers of Cowslips (*Primula veris*) were flowering in early May in Shirehill, Cadwell Hill and all over the banks of the M4 slip road from A46, G, PJC. Many interesting records for Clifton Down are given by RLB in his article in this issue on phenology, making reference to both flowering and fruiting times.

As a result of some major dredging of a ditch in Walton Moor, carried out through the efforts of English Nature and the Somerset Rare Plants Group, *Cyperus fuscus* (Brown Galingale) showed a remarkable increase in 2003. Although this plant occasionally has had a few good years, in many years numbers flowering have been very small, not often in more than single figures and in some years searches have failed to find any flowering plants at all. It grows very well in cultivation (RSC) and clearly needs bare patches for successful colonization.

Plant records this year have been substantial, showing that even in such a well-

known area botanically as the Bristol region, there are still plants to be found, albeit some of which are new arrivals. A notable record in 2003 is of Fly Orchid (*Ophrys insectifera*) in the new site of Ammerdown Park, near Kilmersdon. New to N. Somerset is *Rorippa islandica* (Northern Yellowcress), another outstanding record for the Bristol region, possibly being spread by birds? An interesting, apparently new arrival, in the Avon Gorge is *Gentianella amarella* (Autumn Gentian); although known in the Mendips and around Bath, this seems a substantial extension of its range. The alien *Amaranthus powellii* (Powell's Amaranth) is new to both v.c.6 and v.c.34. Notable alien grasses found in 2003 in v.c.34 include *Echinochloa crus-galli* (Cockspur) and *Setaria viridis* (Green Bristle-grass). A new record for v.c.6 and indeed Somerset is *Iva xanthiifolia* (Marsh-elder), perhaps brought to the area by birds. Records this year include a considerable number from the City of Bristol, showing that urban areas are probably much under-recorded. The City Docks have yielded *Impatiens capensis* (Orange Balsam) and the City walls *Erinus alpinus* (Fairy Foxglove).

A review of the New Atlas of the British and Irish Flora by C.D. Preston, D.A. Pearman and T.D. Dines (2002), given in Somerset Archaeology and Natural History, the Proceedings of the Somerset Archaeological and Natural History Society, Vol. 146 for 2002, makes some reference to the plant life of Somerset.

A fascinating article entitled Ida M. Roper, Naturalist Extraordinaire by Mary Beckett, working in the Herbarium of the School of Botany of the University of Leeds, is issued in this publication. This account gives much information about the life of Miss Roper, F.L.S., who gave considerable help to J.W. White in the preparation of The Flora of Bristol (1912). Her herbarium collection of some 10,000 sheets, transferred from Bristol to Leeds in 1935, is now being catalogued. It contains many sheets of Viola and an especially notable one is of the Charophyte *Nitella mucronata*. The latter, dated 1917, is a specimen collected at its then most westerly station in England, from a pond at Wickwar, G, and was newly named as var. *gracillima*.

Colin E. Trapnell, O.B.E., died at the age of 96 in February 2004. He was long involved in ecological work, including mapping, in Northern Rhodesia (Zimbabwe) and Kenya but retired to Bristol in 1962. He acted as chairman of The National Trust Leigh Woods Committee of Management for many years and helped the foundation of the Somerset Wildlife Trust. His surveys of the Somerset peat moors led to the formation of early nature reserves at Catcott and West Hay. In 1930 he added *Empetrum nigrum* ssp. *hermaphroditum* (Crowberry) to the British flora. From the 1920s onwards he contributed records to the flora of the Bristol region, including *Carex extensa* (Long-bracted Sedge) in 1923 for the Gloucestershire section and Crataegus orientalis

(Oriental Hawthorn) still present at Shapwick in 1970.

Names of contributors of plant records are abbreviated thus:

RLB	R.L. Bland
PJC	P.J. Chadwick
RSC	R.S. Cropper
KG	K. Giles
IPG	I.P. Green
PRG	P.R. Green
CK	Clare Kitchen
MARK	M.A.R. Kitchen
PM	Pam Millman
PJMN	P.J.M. Nethercott
EGMN	E.G.M. Niblett
JS	J. Sweet
MJT	M.J. Trotman
DW	D. Warden

The area covered by this report is essentially that defined by J.W. White for his Flora of Bristol (1912). The eastern boundary is taken as the old boundary of Wiltshire where it meets the old boundaries of both Gloucestershire and Somerset. The southern limit is taken as approximately the course of the River Brue along some of its length. The area comprises the northern part of the Watsonian vice-county of North Somerset (v.c.6) and the southern part of West Gloucestershire (v.c.34). In the following records these parts are designated S and G respectively.

Plant names are in accordance with C. Stace New Flora of the British Isles, 2nd edition, 1997.

Asplenium adiantum-nigrum L. **Black Speenwort**. In good quantity on wall, Spring Hill, Kingsdown, Bristol, G, MARK.

Cystopteris fragilis (L.) Bernh. **Brittle Bladder-fern**. Several plants in brick steps near the church, Shipham, S, and PM.

Polypodium vulgare L. **Polypody**. A clump of a few fronds in small former quarry in wood, with *P. interjectum Shivas* (**Intermediate Polypody**) also in small quantity nearby, Heneage Court Wood, Falfield, G, MARK. Specimen in Herb. MARK.

Botrychium lunaria (L.) Sw. **Moonwort**. In 2002 five plants in woodland at top of Avon Wildlife Trust Tickenham Hill Reserve, S, KG. There were only three plants in 2003, but with larger fertile fronds, KG. Small wire netting cages protect the plants from deer.

Ophioglossum vulgatum L. **Adder's-tongue**. A good patch, with fertile fronds, beneath trees, Spoil Coppice, Lower Woods, Wickwar, G, RSC.

Ranunculus ophioglossifolius Vill. **Adder's-tongue Spearwort**. A single plant in very overgrown marsh, Inglestone Common, Hawkesbury C.P., G, MJT, also RSC.

Nymphaea alba L. **White Water-lily**. In City Docks, Bristol, G, RLB.

Ceratophyllum submersum L. **Soft Hornwort**. Still plentiful, where first seen in 1976, in pool at Kenn, S, RSC.

Papaver dubium L. ssp. *lecoqii* (Lamotte) Syme **Long-headed Poppy**. Several plants outside cottage garden, Stanton Prior, S, PM.

Fumaria muralis Sond. ex W.D.J. Koch ssp. boraei (Jord.) Pugsley Common **Ramping-fumitory**. One plant, laneside hedgebank, Rodney Stoke, S, RSC.

F. officinalis L. **Common Fumitory**. Edge of harvested cornfield, Stanton Wick Farm, near Stanton Wick, S, PM.

Lepidium campestre (L.) W.T. Aiton **Field Pepperwort**. In gutter, Clifton, Bristol, G, RLB. Also on strip where new water main was laid across Durdham Down, near the White Tree roundabout, G, RLB. Among over a hundred species noted in the area by RLB were *Chenopodium polyspermum* L. (**Many-seeded Goosefoot**), *Cirsium acaule* (L.) Scop. (**Dwarf Thistle**), *Conium maculatum* L. (**Hemlock**), *Geranium rotundifolium* L. (**Round-leaved Crane's-bill**) and *Verbena officinalis* L. (**Vervain**).

Cochlearia danica L. **Danish Scurvygrass**. Still spreading along roads, noted near Hambrook and Bromley Heath, Bristol, G, RLB. Abundant at the bases of several street trees, by the New Cut, Coronation Road, Southville, Bristol, G, MARK & CK. One plant in pavement crack, Burnham-on-Sea, S, RSC.

Rorippa islandica (Oeder ex Gunnerus) Borbás **Northern Yellowcress**. Forty-eight plants on bare soil near shore of lake, Chew Valley Lake, S, PRG. This is a first record for North Somerset (v.c.6) and the second county record for Somerset. It was first found in Clatworthy Reservoir.

Descurainia sophia (L.) Webb ex Prantl **Flixweed**. Five plants at edge of parking area, Gordano Service Station, S, IPG. Also plentiful *Erodium moschatum* (L.) L'Hér. (**Musk Stork's-bill**).

Hypericum androsaemum L. **Tutsan**. A single small plant, probably a recent arrival, woodland in Nature Reserve, Old Sneed Park, Bristol, G, P.J.M.N.

H. montanum L. **Pale St John's-wort**. Several large plants in scrub at base of low cliff, Purn Hill, Bleadon, S, RSC.

Spergula arvensis L. **Corn Spurrey**. A few plants, corner of field about 0.5 km west of Holcombe, S, Cam Valley Wildlife Group. Also *Galeopsis tetrahit* L. (**Common Hemp-nettle**).

Chenopodium polyspermum L. **Many-seeded Goosefoot**. Covering about ten square metres by gate in pasture field, Walton Moor NNR, S, PM. One flowering and fruiting plant on dumped earth, Dulcote Hill Quarry, southeast of

Wells, S, RSC.

Atriplex portulacoides L. **Sea-purslane**. A good flowering patch, seen from M.V. Balmoral, lower edge of saltmarsh, Royal Portbury Dock, S, MARK & CK.

Malva moschata L. **Musk-mallow**. Abundant throughout the lower field, AWT Tickenham Hill Reserve, S, PM.

Althaea officinalis L. **Marsh-mallow**. One flowering plant at base of seawall, Severn Beach, G, P. Bowerman, comm. B. Lancastle. This plant was noted by J.W. White in his Flora of Bristol (1912), p.202, by the railway between Avonmouth and New Passage in 1905. A large flowering clump, where reported in 1993 by MARK & CK (Bristol Botany in 1993, p.38), Redcliff Bay, near Portishead, S, PM.

Geranium pusillum L. **Small-flowered Crane's-bill**. On waste, City Docks, Bristol, G, RLB. Also *Rorippa palustris* (L.) Besser (**Marsh yellow-cress**) and *Cytisus scoparius* (L.) **Link (Broom**).

Trifolium squamosum L. **Sea Clover**. Two flowering patches at top of saltmarsh, Sand Bay, S, RSC. Apparently a recent arrival here.

Lotus glaber Mill. **Narrow-leaved Bird's-foot-trefoil**. Stockwood Vale, S, Libby Houston.

Hippocrepis comosa L. **Horseshoe Vetch**. On waste, Avonmouth, G, RLB. Also *Lysimachia vulgaris* L. (**Yellow Loosestrife**) and *Lychnis flos-cuculi* L. (**Ragged-Robin**).

Onobrychis viciifolia Scop. **Sainfoin**. One plant on disturbed ground, north bank of Huntspill River, West Huntspill, S, RSC.

Vicia sylvatica L. **Wood Vetch**. A large patch on old railway line, where first found in 1986, Windsor Hill, Shepton Mallet, S, RSC.

Lathyrus sylvestris L. **Narrow-leaved Everlasting-pea**. In hedge covering an area about 3 m × 2 m high, Cadbury lane side of lower field, AWT Tickenham Hill Reserve, S, PM.

Potentilla neumanniana Rchb. **Spring Cinquefoil**. Numerous flowering plants adjoining path and many non-flowering rosettes on path, near Iron Age site, Walton Common, S, PM.

P. × mixta Nolte ex Rchb. **Hybrid Cinquefoil**. Several plants, Titters Hill, Thornbury, G, MARK, det. Dr B. Harold. Specimen in Herb. MARK.

Rosa obtusifolia Desv. **Round-leaved Dog-rose**. One bush in hedgerow, Walton Moor, S, RSC.

R. tomentosa Sm. **Harsh Downy-rose**. Two bushes by track, Westridge Wood, Wotton-under-Edge, G; one large bush at woodland edge, with *R. stylosa* Desv. (**Short-styled Field-rose**) nearby, north of drove to Ammerdown House, Ammerdown Park, near Kilmersdon, S, RSC.

Saxifraga granulata L. **Meadow Saxifrage**. Plentiful in May in limited area of lower slopes of hillside (ST 767881), Hawkesbury, G, RSC. This is probably

the site discovered by Dr D. Munro Smith in 1955 (see Bristol Botany in 1955, p.102, where the plant is reported as 'a most interesting addition to the Glos. side of our area').

Daphne laureola L. **Spurge Laurel**. A few scattered bushes flowering in early March, The Perch, Shipham, S, RSC.

Crithmum maritimum L. **Rock Samphire**. Severn Beach, G, B. Lancastle.

Oenanthe lachenalii C. C. Gmel. **Parsley Water-dropwort**. Several plants in damp areas at top of saltmarsh, Sand Bay, S, RSC.

Euphorbia platyphyllos L. **Broad-leaved Spurge**. In several places by footpath and at top edge of field about 1 km west of Wellow, S, Cam Valley Wildlife Group.

E. exigua L. **Dwarf Spurge**. On footpath and in cereal crop, top edge of field about 1 km west of Wellow, S, Cam Valley Wildlife Group.

Gentianella amarella (L.) Börner **Autumn Gentian**. In sparse vegetation of fixed scree slope, Quarry 4, Avon Gorge, S, N. Hudson. This is a first record for the Avon Gorge.

Nymphoides peltata Kuntze **Fringed Water-lily**. In great abundance, dominating fringing vegetation, Heneage Court Lake, Falfield, G, MARK & CK. This is a relatively recent arrival, presumably introduced, in lakes created since the 1987-1988 BSBI survey.

Verbascum nigrum L. **Dark Mullein**. In open ground adjoining Norton's Wood, near Cleveland Court, Clevedon, S, EGMN. A group of six plants were flowering on 18 October, distinct from but not very far from the locality where seen previously.

Limosella aquatica L. **Mudwort**. A single large flowering plant, Chew Valley Lake, S, PRG.

Clinopodium ascendens (Jord.) Samp. **Common Calamint**. Ozleworth Bottom, south of Ozleworth, G, J.A. Bailey.

Plantago major L. ssp. *intermedia* (Gilib.) **Lange Greater Plantain**. Plentiful along shore, Chew Valley Lake, S, PRG. This is a first record for v.c.6, but known from several reservoirs in S. Somerset.

Valerianella locusta (L.) Laterr. **Common Cornsalad**. In gutters and pavements, Clifton and several adjoining 1-km squares, Bristol, G, RLB. This plant is probably much under-recorded in the urban area.

Valeriana dioica L. **Marsh Valerian**. Several plants, Windsor Hill Marsh, Shepton Mallet, S, RSC.

Seriphidium maritimum (L.) Polj. **Sea Wormwood**. A small patch on riverine cliffs, seen from M.V. Balmoral, west of Chapel Pill, Pill, S, MARK & CK.

Cirsium eriophorum (L.) Scop. **Woolly Thistle**. Several near Tormarton, G, PJC. At road junction, Burnett, S, RSC.

Centaurea cyanus L. **Cornflower**. On newly constructed bank, perhaps arising from a 'wild flower' seeding programme, Avonmouth Docks, G, RLB.

Cichorium intybus L. **Chicory**. Stockwood, Bristol, S, RLB. Also *Hieracium maculatum* Sm. (**Spotted Hawkweed**) and *Sherardia arvensis* L. (**Field Madder**).

Gagea lutea (L.) Ker Gawl. **Yellow Star-of Bethlehem**. A single leaf only (non-flowering), Beach Wood, northwest of North Stoke, G, M. Jannick, comm. B. Laney.

Colchicum autumnale L. **Meadow Saffron.** More than fifty flowers, half white and half pink, late August and early September, Dyrham Wood, Dyrham and Hinton C.P., G, M. Jannick. Flowering on steep hedgebank, northwest of Compton Dando towards Queen Charlton, S, N. Hudson. Poor flowering in 2003 (relative to 2002), near Woodford, Chew Valley, S, DW.

Allium schoenoprasum L. **Chives**. In gutter, Redland, Bristol, G, RLB. Also *Pyracantha coccinea* M. Roem. (**Firethorn**).

Cephalanthera damasonium (Mill.) Druce **White Helleborine**. Eight flowering plants in shady woodland near track, Cleaves Wood, southwest of Hinton Charterhouse, S, RSC.

Epipactis purpurata Sm. **Violet Helleborine**. Thirteen flowering spikes in excellent condition, Littley Wood, G, MJT. In this known site, only two of the plants were in the original wire enclosure, the others being scattered from this up to some fifty metres away.

Spiranthes spiralis (L.) Chevall. **Autumn Lady's-tresses**. In good quantity, west of Fierypits Brake, Elberton, G, MARK.

Neottia nidus-avis (L.) Rich. **Bird's-nest Orchid**. About twenty flowering spikes in shady area, north side of Big Ride, Westridge Wood, Wotton-under-Edge, G; also three spikes under trees by drive to Ammerdown House, Ammerdown Park, near Kilmersdon, S, RSC.

Platanthera chlorantha (Custer) Rchb. **Greater Butterfly-orchid**. A single specimen; also a small colony of *Listera ovata* (L.) R. Br. (**Common Twayblade**) and a colony of *Paris quadrifolia* L. (**Herb-Paris**) additional to the one reported in 2001, Weston Big Wood, S, EGMN.

Ophrys insectifera L. **Fly Orchid**. About a dozen spikes beneath trees, south side of drive to Ammerdown House, Ammerdown Park, near Kilmersdon, S, RSC (informed by R.J. Lawrence). This record is new to the area.

Orchis morio L. **Green-winged Orchid**. Flowering by mid-April, better than in 2002 when there was grazing damage, Villice, Chew Valley, S, DW.

Dactylorhiza praetermissa (Druce) Soó **Southern Marsh-orchid**. Nine flowering spikes, but *D. fuchsia* (Druce) Soó (**Common Spotted-orchid**) more frequent, Moreton, Chew Valley, S, DW.

Spirodela polyrhiza (L.) Schleid. **Greater Duckweed**. In tiny pond, Stockwood, Bristol, S, RLB.

Eriophorum latifolium Hoppe **Broad-leaved Cottongrass**. Thirty-two fruiting heads, Max Bog, Winscombe, S, RSC. This is the highest count since 1995.

Isolepis setacea (L.) R. Br. **Bristle Club-rush**. Flowering with *I. cernua* (Vahl) Roem. & Schult. (**Slender Club-rush**), at margin of recently-cleared rhine, Walton Moor, S, RSC.
Eleocharis uniglumis (Link) Schult. **Slender Spike-rush**. Still in quantity in marshy area, Windsor Hill, Shepton Mallet, S, RSC. *Blysmus compressus* (L.) Panz. ex Link (**Flat-sedge**) also persisting here.
Cyperus fuscus L. **Brown Galingale**. After conservation work, this was a good year for this species in the Gordano Valley. In August there were some sixty flowering plants and over a hundred seedlings on Walton Moor, S, RSC.
Carex strigosa Huds. **Thin-spiked Wood-sedge**. With *C. sylvatica* Huds. (**Wood-sedge**), steep-sided woodland, Bath Spa University grounds, southwest of Newton St Loe, S, PM.
Bromus commutatus Schrad. **Meadow Brome**. Winscombe, S, RSC.

ALIENS
Diplotaxis muralis (L.) DC. **Annual Wall-rocket**. Single plant by gatepost in broken edge of pavement, Flax Bourton road, near Failand, S, PM.
Rapistrum rugosum (L.) J.P. Bergeret **Bastard Cabbage**. Two plants on disturbed soil, near dumped building rubble, Manor Farm, Failand, S, PM.
Lepidium draba L. subsp. draba **Hoary Cress**. Substantial colony on roadside verge outside Osmond's Nursery adjacent to main Gloucester-Bristol railway line, Wickwar, G, MJT.
Amaranthus retroflexus L. **Common Amaranth**. One plant on stonework of bridge, Herriotts Bridge, Chew Valley Lake, S, PRG.
A. powellii S. Watson **Powell's Amaranth**. Three plants, Cowhill, G, MARK & CK, det. E.J. Clement. This infrequent casual is a first record for v.c.34 and for Gloucestershire. Several plants in maize field, Westhay Level, S, R. Woodall, det. E.J Clement. Seen later here by IPG and in several other maize fields in the area.
A. blitum L. **Guernsey Pigweed**. Several plants growing as weeds in pots of Palm trees, Cadbury Nursery (Garden Centre), S, IPG.
Oxalis debilis Kunth **Large-flowered Pink-sorrel**. Claverham Drove, Kenn Moor, S, Faith Moulin.
Impatiens capensis Meerb. **Orange Balsam**. On floating island, City Docks, Bristol, G, RLB. Also *Bidens frondosa* L. (**Beggarticks**) and *Oenanthe crocata* L. (**Hemlock Water-dropwort**).
Ailanthus altissima (Mill.) Swingle **Tree-of-heaven**. Street tree, Stockwood, Bristol, S, RLB. In a search of the 1-km square ST 6268 (Stockwood), checked as part of the Local Change survey of the Botanical Society of the British Isles, over eighty species were noted which had not been recorded previously. Other notable street trees here include *Acer cappadocicum* Gled. (**Cappadocian Maple**), *A. negundo* L. (**Ashleaf Maple**), *A. saccharinum* L. (**Silver Maple**), *Alnus cordata* (Loisel.) Duby (**Italian Alder**), *Nothofagus obliqua* (Mirb.)

Blume **(Roble)**, *Quercus cerris* L. (**Turkey Oak**), *Robinia pseudoacacia* L. (**False-acacia**) and *Sorbus intermedia* (Ehrh.) Pers. (**Swedish Service-tree**). All records RLB.

Laburnum anagyroides Medik. **Laburnum**. In gutter, Clifton, Bristol, G, RLB. A few plants known for some time on edge of pathway, East Wood, Portishead, S, EGMN.

Lathyrus latifolius L. **Broad-leaved Everlasting-pea**. In rough ground between public footpath and hedge, Manor Farm, Failand, S, PM.

Duchesnea indica (Jacks.) Focke **Yellow-flowered Strawberry**. A large flowering and fruiting patch (several metres) along woodland ride, Old Lodge Farm woods, Tortworth, G, MARK & CK.

Prunus cerasifera Ehrh. **Cherry Plum**. Tree exposed on clearance for a 'butterfly ride', AWT Tickenham Hill Reserve, S, PM.

Sedum stoloniferum S. G. Gmel. **Lesser Caucasian-stonecrop**. Several patches, verge of lane west of Haybow Farm, near St Georges, east of Worle, S, IPG.

S. rupestre L. **Reflexed Stonecrop**. A substantial colony on rocky ground on roadside verge, Wickwar, G, MJT, conf. MARK & CK, who have long known this plant in this locality. Specimen in Herb. MARK.

Heracleum mantegazzianum Sommier & Levier **Giant Hogweed**. One plant on roadside verge from Hillesley Village to Inglestone Common, G, MJT.

Euphorbia maculata L. **Spotted Spurge**. Several plants growing as weeds in pots of Palm trees, Cadbury Nursery (Garden Centre), S, IPG.

Persicaria wallichii Greuter & Burdet **Himalayan Knotweed**. In scrub, Moorend, G, RLB.

P. capitata (Buch.-Ham. ex D. Don) H. Gross **Pink-headed Knotweed**. Single large flowering plant at base of wall, Market Street, Wotton-under-Edge, G, MARK and later by MJT.

Fallopia japonica (Houtt.) Ronse Decr. **Japanese Knotweed**. On waste, Avonmouth, G, RLB. Also *Hyacinthoides hispanica* (Mill.) Rothm. (**Spanish Bluebell**) and *Gladiolus communis* L. (**Eastern Gladiolus**).

Phacelia tanacetifolia Benth. **Phacelia**. Three flowering spikes on track, northern edge of West Littleton Down; also wide strip of flowers in field with crops for game birds, Shirehill Farm, southeast of West Littleton Down, G, PJC, det. A.J. Willis. At edge of field sown by Avon Wildlife Trust with 'bird-seed', Weston moor AWT Reserve, S, PM.

Symphytum asperum Lepech. **Rough Comfrey**. On verge of green lane, northeast from last house in village, Stanton Prior, S, PM & Helena Crouch. Also large clump in track verge heading northeast from east end of village, near Stanton Prior, S, PM.

Borago officinalis L. **Borage**. On newly constructed bank, Avonmouth Docks, G, RLB.

Lappula squarrosa (Retz.) Dumort. **Bur Forget-me-not**. Near Temple

Meads station, Bristol, G, RLB, conf. A.G. Smith.

Datura stramonium L. **Thorn-apple**. Several plants in garden, Clifton, Bristol, G, RLB. In arable field, Park Farm, Norton Hawkfield, Pensford, S, JS.

Erinus alpinus L. **Fairy Foxglove**. On old wall, Southville, Bristol, G, RLB.

Veronica peregrina L. **American Speedwell**. Single plant, weed in flower pot, Cadbury Nursery (Garden Centre) near Congresbury, S, IPG. Also one plant of *Cardamine corymbosa* Hook. f. (**New Zealand Bitter-cress**), a few of *Galinsoga parviflora* Cav. (**Gallant-soldier**) and *G. quadriradiata* Ruiz & Pav. (**Shaggy-soldier**), several of *Conyza sumatrensis* (Retz.) E. Walker (**Guernsey Fleabane**) and *C. canadensis* (L.) Cronquist (**Canadian Fleabane**) and plentiful *Urtica urens* L. (**Small Nettle**), all IPG.

Campanula poscharskyana Degen **Trailing Bellflower**. Newly recorded at eight further 1-km grid squares, Bristol, G, RLB. Also *C. portenschlagiana* Schult. (**Adria Bellflower**) in thirteen previously unrecorded 1-km squares, Bristol, G, RLB.

Galinsoga quadriradiata Ruiz & Pav. **Shaggy-soldier**. In 2002 and earlier years, Tailor's Court, off Broad Street, Bristol, G, Jean Oliver. In gutter, Clifton, Bristol, G, RLB. In damp area, footpath edge, Charlton Bottom, S, PM & Jenny Dowell.

Ambrosia artemisiifolia L. **Ragweed**. One plant on stonework of bridge, where the public feed the birds, Herriotts Bridge, Chew Valley Lake, S, PRG.

Iva xanthiifolia Nutt. **Marsh-elder**. Single plant on stonework of bridge, where birds fed, Herriotts Bridge, Chew Valley Lake, S, A. Stevenson, det. Dr J.R. Akeroyd. This is a first record for v.c.6 and for Somerset.

Inula helenium L. **Elecampane**. Four flowering spikes on wood and field border, Lower Woods, Wickwar, G, MJT (shown by Dr W. Burrows). A single plant was reported here by MARK & CK in 1990 (see Bristol Botany in 1990, Proc. BNS, 50, p. xxxix). At edge of woodland, Park Farm, North Hawkfield, Pensford, S, JS.

Anaphalis margaritacea (L.) Benth. **Pearly Everlasting**. In rough grassland in area cleared of scrub two years previously, AWT Tickenham Hill Reserve, S, KG.

Erigeron karvinskianus DC. **Mexican Fleabane**. Two large flowering plants at foot of wall, Kingswood, Wotton-under-Edge, G, MJT. On waste, City Docks, Bristol, G, RLB. Also on this waste *Erophila verna* (L.) DC. (**Common Whitlow Grass**), *Saponaria officinalis* L. (**Soapwort**) and *Parietaria judaica* L. (**Pellitory-of-the-wall**), RLB.

Artemisia biennis Willd. **Slender Mugwort**. One plant, Chew Valley Lake, S, PRG.

Tragopogon porrifolius L. **Salsify**. Edge of Durdham Down (Fairyland), Bristol and also garden weed, Clifton, Bristol, G, RLB.

Allium roseum L. **Rosy Garlic**. On waste, City Docks, Bristol, G, RLB.

A. triquetrum L. **Three-cornered Garlic**. In gutter, Clifton, Bristol, G, RLB.

A few plants, known for several years, on edge of path, East Wood, Portishead, S, EGMN.

Bromus secalinus L. **Rye Brome**. A single plant, edge of maize field, Falfield, G, MARK & CK.

Gaudinia fragilis (L.) P. Beauv. **French Oat-grass**. Flowering in some numbers in two places in grassland with southwest aspect, Uphill, S, RSC.

Echinochloa crus-galli (L.) P. Beauv. **Cockspur**. Kington, near Thornbury, G, MARK & CK, conf. T.B. Ryves. Specimen in Herb. MARK.

Setaria viridis (L.) P. Beauv. **Green Bristle-grass**. Several plants at top of Jacobs Wells Road, Brandon Hill, Bristol, G, MARK & CK, det. T.B. Ryves. Also at Southmead Hospital, Bristol, G, CK, conf. T.B. Ryves. Specimens in Herb. MARK.

Acknowledgements: I thank everyone who has supplied plant records and helped with these, especially Mr R.L. Bland, Mr R.S. Cropper, Helena Crouch (who supplied records from walks of the Cam Valley Wildlife Group), Mr I.P. Green, Mrs C. & Mr M.A.R. Kitchen, Pam Millman and Mr P.J.M. Nethercott.

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Black tailed Skimmer *Orthetrum cancellatum*

Proceedings of the Bristol Naturalists' Society (2003) 63:76-105

Bristol Mammal Report 2003

David P. C. Trump and Mary J.Trump

Introduction

The intention of this mammal report is to be a wide-ranging review of the records and studies of mammals in and around the Bristol area and to report on significant issues and events affecting British mammals in 2003. The number of one-kilometre squares in which those species were positively recorded is given in brackets after the scientific name, followed by the number of one kilometre squares for 2002, 2001 and 2000. Where no grid reference was provided, the record is not included in this total. The former county of Avon covers an area of approximately 1300 square kilometres, and so the number of 1 km squares for which records have been received gives an indication of the abundance of each species. All grid references are for the 100 km grid square ST. The differences between the years is likely to be due to changes in numbers and locations of recorders rather than changes in mammal abundance or distribution.

REPORTS ON MAMMALS

INSECTIVORA (hedgehogs, shrews and moles)

Hedgehog *Erinaceus europaeus (26 1 km squares for 2003, 45 for 2002, 38 for 2001)*

There were road casualty records from the following 1 km squares:- 4170(2 records), 4771, 4971, 5271, 5382, 5485, 5579, 5585(5), 5671, 5673, 5679, 5773, 5778, 5781, 5876(3), 6089, 6382, 6388, 6474, 6489, 7576.

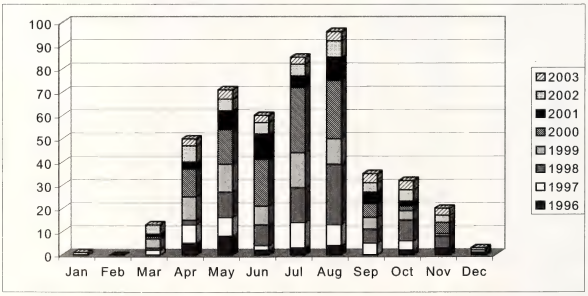

Figure 1. Number of Hedgehog Road Casualty Records per Month 1996-2003

Eight years of data and 466 records of road casualty Hedgehogs show two main peaks (Fig 1): a smaller peak in May when most Hedgehogs have emerged from hibernation and a larger peak in July/August when the young of the year disperse. Hedgehog road casualties have now been recorded in every month of the year except February.

Other records from: 5585, 5686, 5771(2), 5773, 5876(2).

Jeff Rawlinson kept an interesting record of hedgehog activity in his large rural garden in Pilning. The first sign of hedgehogs was on 28 February with two individuals seen. One of these hedgehogs was very small and it was a possibility that it was one he helped through the winter by putting out food in his garage. There were signs and one individual seen during March and April. May was a month of great hedgehog activity but unfortunately one was also found dead on the road outside the house. Regular signs were seen in June. Another road casualty was found on 1 July but one hedgehog was seen feeding twice during July. Further sightings were made in August and September and they eventually stopped taking food at the end of October.

Recorded by RLB, DB, PJC, DM, JM, HGN, SN, JR, DT, MT.

Mole *Talpa europea (56,63,69,151)*
Records of Mole hills from the following 1 km squares: 4472, 4573, 4673, 4858, 5276, 5376, 5377(5), 5378(3), 5476, 5477(3), 5481, 5577, 5578, 5585, 5669, 5670, 5671, 5678, 5682, 5762, 5785, 6176, 6268, 6276, 6370, 6371, 6377, 6477, 6478, 6479(2), 6579, 6581, 6582, 6682, 6683, 6684, 6688, 6690, 6789, 6884, 6891, 7092, 7170, 7474, 7476, 7574, 7575, 7576, 7577, 7675, 7677, 7685, 7774, 7777, 7784, 7878.

Recorded by RLB, PJC, KG, JR, DT.

The Times (of London), 3 March, reported that Mole numbers were soaring as a result of Mole catchers having been banned from farmland during the foot and mouth epidemic two years ago and because of a shortage of the poison strychnine. A pharmaceutical company had scaled down orders from India during the disease period and had been unable to renew supplies. Pest controllers were having to resort to the use of traps, which one operative said added £15 per hour to control costs.

'Golfers fight against mole pitch invasion' (*Bristol Evening Post* 7 March 2003). Hundreds of new holes suddenly appeared on the council pitch and putt golf course in Portishead making it almost impossible to play. It was thought

that the mild winter weather had resulted in a lasting supply of insects for the Moles to feed on and the ground had remained soft to allow them to dig tunnels.

Common Shrew *Sorex araneus* (5,4,3,1)
Records from the following 1 km squares: 4373/4573/4673/6060 (see The Small Mammals of Clapton Moor Nature Reserve below), 5585 (adult seen feeding on debris removed from pool – July, 2 adults dead in garden – August).

Recorded by JR, DT.

Pygmy Shrew (6,4,0,0)
Records from the following 1 km squares:- 4373/4573/4673/6060 (see The Small Mammals of Clapton Moor Nature Reserve below); 5486 (one retrieved alive from two cats), 5569.

Recorded by BL, LR, DT.

Water Shrew *Neomys fodiens* (2,2,0,0)
Records from the following 1 km squares:- 4573 (see The Small Mammals of Clapton Moor Nature Reserve below), one water shrew skull found in an owl pellet at Folly Farm 6060 (Gareth Jones pers. comm.)

CHIROPTERA (Bats)

Greater Horseshoe Bat *Rhinolophus ferrumequinum* (1,1,0,1)

Thirteen counted out of a stable block roost at Tyntesfield (5071) on 22 May. None seen on a second visit on 26 June (ABG).

Martin Longley reported on the success of the English Nature Greater Horseshoe Bat project (Longley 2003). The project was established in 1998 to implement the recommendations of the UK Biodiversity Steering Group, as part of the EN Species Recovery Programme. The Greater Horseshoe Bat was identified as a priority species in the UK Biodiversity Action Plan and objectives and targets were set to 'maintain all existing maternity roosts and associated hibernation sites, and to increase the population by 25% by the year 2010'. To date the major roost sites, housing approximately 85% of the Greater Horseshoe Bat populations in England are now protected as 11 Sites of Special Scientific Interest (SSSIs) and two candidate Special Areas of Conservation (cSACs). Following detailed research that found that the bats can forage over 4 km from roosts each night in search of insect prey, the project has also prepared and distributed advice on the management of these foraging areas and

encouraged this favourable practice through the adoption of land-management agreements, in particular through the Defra funded Countryside Stewardship Scheme. The project focussed on land surrounding the large maternity roosts in Devon (which supports about 30% of the current UK population), Cornwall and Somerset. Contact was made with the majority of landowners within the 4 km radius 'target' areas around each roost and advice provided on bat conservation and sympathetic land management practices – positive hedgerow and woodland management, adoption of low-input grassland management using grazing animals and the use of selective chemical wormers on grazing stock. To date, the project has secured ten-year Countryside Stewardship agreements on 46 holdings covering over 4,300 hectares. In addition a further 31 applications covering 2,300 hectares have been adapted to include sympathetic land-management practices for bats. Based on summer counts, the combined Greater Horseshoe Bat populations from all the Devon maternity roosts have increased by c 58% since 1995 and it would appear that the ambitious target of increasing the UK population by 25% by 2010 might be met.

Lesser Horseshoe Bat *Rhinolophus hipposideros* (4,9,0,3)
112 were counted out of Upper Langford roost (4559) on 2 June, 126 counted out on 21 June. One was reported in the Ashton Court icehouse (5571) on 1 November and another seen here on 27 November. 19 seen in the Brockley Combe "Bowling Green" cellar (4766) on 27 November. 56 counted whilst emerging into courtyard at Tyntesfield (5071) on 22 May, 68 counted on 26 June

Recorded by ABG, LR.

Whiskered Bat/Brandt's Bat *Myotis mystacinus/brandtii* (1,1,0,0)
At least one individual seen/heard over garden pond and verandah at Tyntesfield (5071) 22 May and 26 June (ABG).

Natterer's Bat *Myotis nattereri* (1,3,1,3)
Usual maternity roost at Burnett (6665) (DT).

Bechsteins Bat *Myotis bechsteinii* (1,1,0,0)
One found in a box at Folly Wood (6060) in July (JK/ABG).

Daubenton's Bat *Myotis daubentoni* (0,2,1,0)
No records for the year.

Serotine *Eptesicus serotinus* (2,2,0,0)
Two foraging all summer over Long Ashton (5570) (LR). One seen/heard at

Tyntesfield (5071) on 26 June (ABG).

Noctule *Nyctalus noctula* (4,4,3,1)
Two seen foraging at Newtown (5861) on 4 September, two seen foraging over Walton Moor (4373) on 9 September. Seven found in a 2FN bat box at Folly Wood (6060). Three seen at Tyntesfield (5071) on 26 June.

Recorded by ABG, JK, LR

Leisler's Bat *Nyctalus leisleri* (0,0,1,0)
No records for the year.

Common Pipistrelle *Pipistrellus pipistrellus* and **Soprano Pipistrelle** *Pipistrellus pygmaeus* (5,12,4+,3)
One seen at Bedminster (5871) on 13 August. Two seen on 15 August in Pilning (5585), one seen hawking on 14 November at 4.15 pm. Up to five seen over St Werburghs Park June/July (6074). 45 kHz and 55kHz bats seen/heard at Tyntesfield (5071) on 22 May. One found in a wooden bat box at Chew Valley (5760) in October.

Records from ABG, JR, LR, DT, NMGT.

Nathusius' Pipistrelle *Pipistrellus nathusii* (0,0, 1,0)
No records for the year.

Brown Long-Eared Bat *Plecotus auritus* (1,1,0,0)
Summer roost in house loft (4472) - first droppings observed 18 April (KG).

The Savernake Tunnel - an important hibernation site for bats

The Savernake Tunnel, on the disused railway line to the south of Marlborough, is now home to at least seven species of hibernating bats. The most frequently recorded bat is Natterer's Bat (more than 93% of the bats recorded) making it one of the most important sites in the world for this species. Daubenton's, Brown Long-eared, and Whiskered/Brandt's Bats are the next most frequently recorded species. Barbastelles Barbastella barbastellus have been recorded four times, Pipistrelles on three occasions and a single Serotine. In the autumn a series of 'swarming' bat counts and mist netting surveys at the tunnel entrances revealed the presence of eight species of bats, again the majority being Natterer's Bats. Summer feeding and roosting surveys of the tunnel area and the adjoining Savernake Forest added Noctule, Bechstein's and Parti-coloured Bats Vespertilio murinus to the list for the area. The Wiltshire Bat Group with support from English Nature, the Forestry Commission, Crown Estates, local

builders and individuals, have over the years been involved in grilling the entrances to the tunnel and creating a series of hibernation sites within the tunnel using wooden and corrugated plastic planks, boards and tiles. Regular winter hibernation surveys, autumn 'swarming' surveys and summer roosting and feeding surveys are planned for the future to monitor this nationally important site for bats (Laurence 2003).

Bat Studies at Bristol University

A number of Daubenton's and Natterer's Bats were caught at their late summer/early autumn 'swarming sites' and fitted with radio-tags so that the catchment area of a swarming site and habitat preferences could be investigated (Parsons and Jones 2003). Daubenton's Bats were found a maximum of 26.7 km from the swarming site and Natterer's Bats 24.8 km. The minimum catchment area of the swarming site measured 254 km^2 for Daubenton's and 497 km^2 for Natterer's Bats. Natterer's Bats appeared to select mixed agricultural areas whereas Daubenton's Bats preferred broad-leaved woodland for foraging. Parkland, woodland and open-water habitats were common around Daubenton's roosts. Some individuals of both sexes of bats returned to the swarming site of capture, but none visited another swarming site suggested that bats may be faithful to only one site and may be inflexible should that site be destroyed. The authors suggest that the favoured habitats and swarming sites be conserved and enhanced to protect these two species.

Wickramasinghe et al (2003) undertook a comparison of bat activity on organic and conventional farms. The dominant species on both farm types were the Common and Soprano Pipistrelles. 'Total bat activity' was significantly higher on organic farms. Significantly more 'bat passes' were recorded over water on organic farms than on conventional farms. Foraging activity was also significantly higher on organic farms. Significantly more Myotis (Daubenton's and Brandt's Bats) activity was recorded on organic farms. Greater and Lesser Horseshoe Bats were only recorded on organic farms in wooded, arable and pasture habitats. The differences in bat activity between farm types may reflect features such as taller hedges and better water quality on organic farms. Higher rates of foraging also suggest that habitat quality in terms of prey availability is greater on organic farms. Less intensive farming benefits bats, and as the numbers of organic enterprises increases it may help to reverse declines in bat populations.

LAGOMORPHA (Rabbits and Hares)

Brown Hare *Lepus europaeus* (24,10, 11,34)
Records from the following 1 km squares: 3156, 4364, 4373, 4569, 4573(3), 5362(2), 5464, 6058, 6059(2), 6259, 6561, 6762, 6862, 6863(2), 6864(2), 6964, 7774, 7775, 7784, 7875, 7974(3), 7975, 8074, 8075.

Recorded by RLB, DB, PJC, PGF, J&S P, LR, DT, MT, DW.

Highlights of this year's records included regular sightings at Avon Wildlife Trust's Walton and Clapton Moor Nature Reserves. More than 20 hares were seen on a Bristol Naturalists' Society field trip to Newton Park and Corston Fields on 15 May, 7 were recorded nearby at Newton Park on 9 May; a leveret was seen on 31 May at Stanton Prior. The southern Cotswolds, around the Marshfield area, is also a "hotspot" for the Brown Hare.

Rabbit *Oryctolagus cuniculus* (52,36,19,105)
Records from the following 1 km squares: 4472, 4573, 4758, 4858, 4874, 5079, 5179, 5180, 5276, 5278, 5280(3), 5378(3), 5379(2), 5381(3), 5382, 5383, 5484, 5579, 5582, 5584, 5585, 5667(2), 5669(2), 5670, 5762(2), 5767, 5879, 5887, 6086, 6176(2), 6177(2), 6286, 6370(2), 6378(2), 6382, 6383, 6386, 6479(3), 6579(2), 6580(2), 6791, 6864, 6874, 7170, 7577, 7585, 7593, 7685, 7784(3), 7877, 7974, 8077.

Recorded by RLB, PJC, KG, J&S P, JR, DT.

RODENTIA (rats, mice, voles and squirrels)

Brown Rat *Rattus norvegicus* (9, 13,6+,17)
Records from the following 1 km squares: 5758(2), 5872, 5973, 6161, 6165, 6170, 6684, 7577, 7975.

Recorded by PJC, PGF, S&J P, JR.

'Special bins to curb city's rat problem' (Bristol Evening Post 24 September 2003) The 'Bristol Clean and Green' campaign group has spent £4,500 on a dozen specially designed litter bins, which include a facility for rat baiting. The bins will be placed at selected sites around the city where there is known to be a rat problem. A council report showed that requests to control rats had jumped from 1,393 in 1998-99 to 2,731 in 2000-01.

Grey Squirrel *Sciurus carolinensis* (59,37,50,77)
Records from the following 1 km squares: 3266, 4161, 4169, 4469, 4472, 4758, 4869, 4870(3), 5377, 5382, 5476, 5477, 5577, 5585, 5686, 5762, 5774, 5778(2), 5782, 5789, 5868, 5871, 5875, 5876, 5970, 5973, 5975(2), 5976(2), 6067, 6071, 6076(2), 6165, 6166, 6169, 6176(2), 6177(2), 6268, 6271, 6273, 6276, 6363, 6370(2), 6372, 6374, 6377, 6374, 6382, 6462(2), 6575, 6579, 6670, 6689, 6874, 6883, 6963, 6964(2), 6983, 7077, 7286.

Richard Bland has kept a note of squirrels seen at his garden bird feeder during the year. Squirrels were seen irregularly during the first part of the year but visited the feeder every week in May. They were absent during the whole of the summer only returning on a regular basis during mid November.

While on his weekly two kilometre walk through Clifton (5673) Richard recorded an average of 1.7 squirrels per hour compared to 1.8 in 2002 and 2.7 in 2001 (Fig 2). The autumn peak in numbers is very distinctive but probably a feature of squirrel behaviour – hunting for acorns etc being more obvious than arboreal feeding. Richard feels that there is an effective population control mechanism at work, whether this is road accidents, territory, weather or food is unclear. The squirrels compete for food with several species of birds that are monitored on the same walk. Grey Squirrels are most similar to Jays in their patterns of numbers and feeding habits.

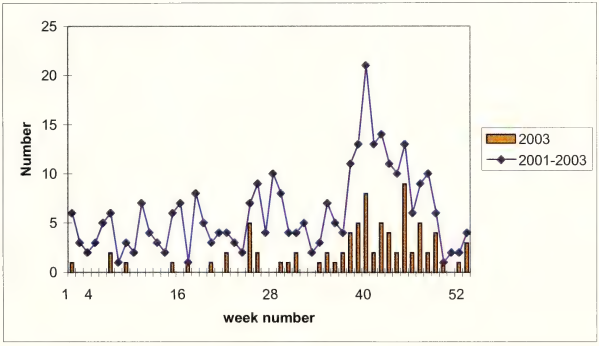

Figure 2. Number of Grey Squirrels counted on a standard 2 km walk through gird square 5673 (trees are 'in leaf' between weeks 15 and 41).

Recorded by RLB, JFB, PJC, PGF, KG, J&S P, JR, DT.

Water Vole *Arvicola terrestris* (2,2,2,0)
Records from the following 1 km squares:- 4771 - unconfirmed reports from the trout farm below Towerhouse Woods (TS/EWe), 6579 - possible water vole burrows (RLB).

The effects of development mitigation on Water Voles
Where Water Vole habitat is likely to be destroyed or modified by development, the 'standard' mitigation technique to avoid incidental mortality of voles is 'displacement' – the removal of vegetation from sections of the watercourse that will be affected by the development. The technique is aimed at encouraging Water Voles to move to adjacent habitat. A recent study by Creswell Associates at a site in Swadlincote, Derbyshire, suggests that Water Voles are significantly more difficult to move form a development zone by using the displacement technique that previously thought. The study, involving radio-tracking a small number of voles, showed that they had a high level of fidelity to their burrow systems and did not move in response to vegetation removal. It was thought that this could make them more vulnerable to predation. Surveys of field signs during the study showed that whilst water Voles continued to occupy the burrows within the area s where the vegetation removal had taken place, their level of above ground activity decreased and therefore field signs were not found. These findings have cast doubt on the value of this mitigation technique (Habitat Management News British Wildlife 14(5) June 2003).

Water Vole rescue and re-introduction on the Kennet and Avon Canal
Rob Strachan and colleagues at WildCRU (University of Oxford) have been involved in a Water Vole rescues and re-introduction programme on the Kennet and Avon canal. During essential repair works to the canal 10 pairs of Water Voles were taken into a captive-breeding programme at Bristol Zoo, with objective that 20 offspring would be returned to the restored canal the following year. A further 45 voles were directly translocated from a section of the bank due to be repaired to one of the refurbished sections. Twenty of the voles were fitted with radio collars and all were fitted with ID tags. All the voles, with the exception of one male, which moved 1.5km to the River Avon, became well established in the man-made burrow systems. Breeding was confirmed shortly after release and at least 60 animals, divided into were identified within the restored bank during the following winter. This bodes well for future rescue operations (Wildlife Reports British Wildlife 15(2) December 2003).

Local Water Vole News
Seventy Water Voles raised at Bristol Zoo will be released at a secret location near the city. All the voles will be ID-chipped and 15 will have radio collars to enable their movements to be recorded. They will be released into specially designed holding pens at their new home (currently uninhabited by Water

Voles) from which they eventually will dig their way out and establish new colonies in the network of wildlife corridors and waterways (Bristol Evening Post 23 April 2003).

Bank Vole *Clethrionomys glareolus* (5,6,1,4)
Records from the following 1 km squares:- 4373/4573/4673 (see The Small Mammals of Clapton Moor Nature Reserve below); 4472, 5585 (one dead on road).

Recorded by KG, JR, DT.

Short-tailed Field Vole *Microtus agrestis* (5,7,2,2)
Records from the following 1 km squares:- 4373/4573/4673/6060 (see The Small Mammals of Clapton Moor Nature Reserve below), 4969.

Recorded by J&S P, DT.

Harvest Mouse *Micromys minutus* (0,0,1,0)
No records for the year.

Common Dormouse *Muscardinus avellanarius* (1,1,0,?)
A series of Dormouse tubes were put up across Keith Giles's garden and the adjacent Avon Wildlife Trust reserve at 4472. One Dormouse was seen leaving a tube that was later identified as a female in good condition for hibernation (weighed in September). Some of the other tubes had also been used by Dormice. The survey will be extended in 2004 and nest boxes will be erected to assess numbers present.

Wood Mouse (Long-tailed Field Mouse) *Apodemus sylvaticus* (9,5,7,6)
Records from the following 1 km squares:- 4573/4673/6060 (see The Small Mammals of Clapton Moor Nature Reserve below); 4472 (live trapped in roof), 4569 (at least 17 individuals trapped and removed from a house), 5585 (adult and juvenile seen regularly between July and September), 5672, 5771 (feeding under bird table), 5873 (Wood Mouse family in a garden in Hanham, enjoying a seed feeder).

Recorded by DB, KG, JR, BT, DT.

House Mouse *Mus domesticus* (3,1,4,3)
Records from the following 1 km squares: 4472 (live trapped in loft and released), 5585, 6780.

Recorded by KG, JR.

Yellow-necked Mouse *Apodemus flavicollis* (0,1,0,0)
No records for the year.

Small Mammal Studies

Suburban Small Mammals

A Bristol University study of small mammals in suburban Bristol (Baker et al 2003) looked at factors affecting their distribution. Abundance of Wood Mice was negatively related to abundance of cats and the distance to the nearest patch of natural or semi-natural vegetation. Predation and fragmentation of habitat were seen as particularly important limiting factors.

The Small Mammals of Clapton Moor Nature Reserve

David Trump completed a twelve month study of the small mammals of the Avon Wildlife Trust's Clapton Moor Nature Reserve (4573, 4673) in August. 120 Longworth live-capture traps were set along six field margins (10 pairs of traps at 10 metre intervals). Traps were set for three consecutive nights in each of the six field margins. Trap lines 1 and 2 were set in mature hedges with 6 metre grass margins/owl corridors – one with a ditch; trap lines 3 and 4 were set in newly planted hedges (1999 and 2002) with six metre rough grass margins/owl corridors; trap lines 5 and 6 were set along ditches with associated bramble scrub with no grass margins. A seventh trap line with 5 pairs of traps was set up in a rush-dominated field

Every two months traps were set to catch for three consecutive nights and all animals caught were identified, weighed, sexed and given an individual fur-clip to aid identification should they be re-captured at a later date before being released again at the site of capture.

	Number of individuals trapped
Wood Mouse Apodemus sylvaticus	142
Bank Vole Clethrionomys glareolus	36
Short-tailed Field Vole Microtus agrestis	12
Common Shrew Sorex araneus	22
Pygmy Shrew Sorex minutus	14
Water Shrew Neomys fodiens	1
Weasel Mustela nivalis	1

Table 1 Results of the Longworth Live-capture trapping.

By far the most abundant species was the Wood Mouse which accounted for 62% of all the animals trapped. (Table 1). The presence of a Water Shrew and Weasel in the Longworth traps were interesting/alarming - in that order!

Small mammal numbers were at their highest in the autumn and early winter, boosted by the large numbers of young animals born that spring/summer (Fig 3).

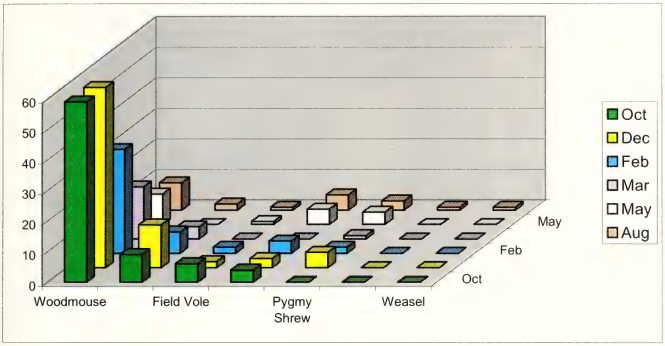

Figure 3 Numbers of small mammals caught in each month at Clapton Moor Nature reserve October 2002 – August 2003

Wood Mice, Common Shrews and Pygmy Shrews were caught in every trap-line (fig 4). Bank Voles were most abundant in margins with tall, mature hedges, being caught in all trap-lines except line 6 (the 'wettest' trap line towards the centre of the reserve). Field Voles were only caught in trap-lines 3, 4 and 6 – those that did not have mature hedges.

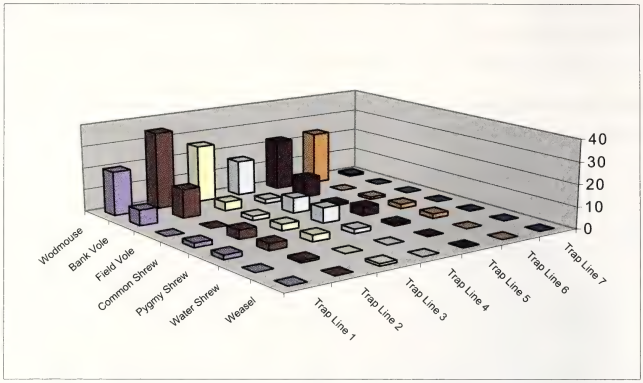

Figure 4 Numbers of small mammals caught in each trap line at Clapton Moor Nature Reserve October 2002 – August 2003.

As part of the study a number of Barn Owl pellets from Weston Moor Nature Reserve (4373) (2.5 km to the west of Clapton Moor Reserve and therefore within hunting range of Barn Owls) and from Folly Farm Nature Reserve (6060 – 17 km east of Clapton) were analysed (Table 2).

Location (Number of pellets)	Common Shrew	Pygmy Shrew	Field Vole	Bank Vole	Wood Mouse
Weston Moor (19)	7	3	39	3	0
Folly Farm (22)	23	3	44	0	4

Table 2 Minimum numbers of each species found in owl pellets.

Field Voles formed the majority of the prey items identified in the owl pellets. For the Weston Moor pellets, there was an average of 2.7 mammals per pellet, 2.05 were Field Voles and every pellet contained at least one Field Vole. For the Folly Farm pellets, the average was 3.7 mammals per pellet of which 2.0 were Field Voles and again every pellet contained at least one Field Vole. The two record pellets were from Folly Farm, one containing the remains of five Common Shrews, two Pygmy Shrews and one Field Vole, the other containing two Common Shrews, one Pygmy Shrew and five Field Voles.

A comparison between the Longworth trap data for Clapton Moor for May 2003 and that of the Weston Moor owl pellets gathered in May 2003 demonstrates that the owls were selectively hunting for Field Voles probably in the rough

grassland habitat at Weston Moor rather than in the owl corridors and field margins at Clapton Moor (Fig 5). Perhaps in time the Field Vole numbers will build up in the owl corridors at Clapton and Barn Owls will use them for hunting. The planting of the new hedgerows along margins 3 and 4 however, may result in higher numbers of Bank Voles and Wood Mice rather than Field Voles.

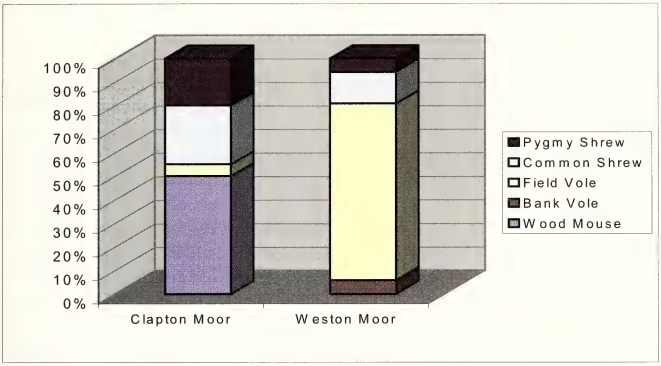

Figure 5 Comparison between May Barn Owl pellets from Weston Moor (n = 52) and May small mammal captures at Clapton Moor (n = 20).

Wetlands as an important habitat for small mammals

Long term studies of the small mammals of the wetlands of the Broads National Park within Suffolk and Norfolk have revealed that they support a wide range of small mammals (Perrow and Jowitt 2003). Eleven species of mammal (Water Shrew, Common Shrew, Pygmy Shrew, Bank Vole, Field Vole, Water Vole, Harvest Mouse, Wood Mouse, Yellow-necked Mouse, Brown Rat and Weasel) were live-trapped during the studies in a variety of wetland habitats. Harvest Mice were the most abundant species in Common Reed and Great Fen-sedge habitat, whereas Alder carr supported large numbers of Bank Voles and Wood Mice. As expected Field Voles were most abundant in the grassy habitats.

Wetland habitat management had a significant impact on the small mammal populations. Reed and sedge cutting had the most severe short-term impact with small mammal numbers re-colonising at different rates as the vegetation recovers. Wood Mice were the first to return utilising the growing reeds within a couple of months, followed by Bank Voles and Common Shrews. Harvest Mice and Field Voles had still not returned over eight months after the reeds had

been cut, preferring to stay in the surrounding unmanaged areas. The impact of grazing livestock on wet grassland on the small mammal populations was also investigated. Even a moderate stocking density (1.2 livestock per hectare) resulted in a relatively cropped sward making the area less suitable for small mammals. Grazed areas supported only four species compared to seven species in ungrazed areas. The number of Field Voles, the dominant 'grassland' species, was reduced by 63% by grazing.

Mammal Society National Road Verge Survey

Between 1999 and 2001 small mammals were trapped in grass road verges throughout Britain. The most frequently trapped species were Wood Mice, Bank Voles, Field Voles and Common Shrews with small numbers of Harvest Mice, House Mice, Yellow-necked Mice, Pygmy Shrews and Water Shrews also being trapped. Field Voles were most frequently trapped on verges in the north and west regions that had a high proportion of grassland. Wood Mouse abundance was highest in the central and eastern areas of Scotland where the proportion of cultivated land has been increasing. In the autumn Wood Mice were more abundant on verges adjacent to arable land that those bordering pasture but the reverse was the case in the spring. Wood Mice were also associated with dense grassy cover whilst the only habitat feature found to be important to Bank Voles was the presence of an adjacent boundary hedgerow. (Wildlife Reports British Wildlife 14(3) February 2003).

CETACEA (whales, dolphins and porpoises) and **PINNIPEDIA** (seals)

Harbour Porpoise *Phocoena phocoena*
Two Harbour Porpoises were seen on the River Avon between Cumberland Road and Coronation Road on 13 April (BRERC Wildlife June 2003 and SC).
Two porpoises (presumed to be Harbour Porpoises) seen off Wains Hill, Clevedon (3970) on 6 April (JA).

A report into cetacean strandings around the UK coastline was published in 2003 (Sabin et al 2003). The following records of strandings from the Bristol Channel ('upstream' of Foreland Point) have been extracted from the maps in the report:-

Harbour Porpoise *Phocoena phocoena* – two records (2002)

Pygmy Sperm Whale *Kogia breviceps* – one record (1966-2002)
Common Dolphin *Delphinus delphis*/**Striped Dolphin** *Stenella coeruleoalba*/unidentified spp. – one record (2002)

The most common UK-stranded cetacean species in 2002 was the Harbour Porpoise with 347 records of strandings. Of the 119 that were examined at post-mortem, 24 were killed by Bottlenose Dolphins Tursiops truncatus, 24 had become entangled in fishing gear (bycatch) and 21 had died of pneumonia. In Southwest England the majority of stranded Harbour Porpoises were as a result of "bycatch".

Grey Seal *Halichoerus grypus* (0,1?,0,0)
No records for the year.

CARNIVORA (carnivores)

American Mink *Mustela vison* (0,2,0,3)
No records for the year.

Mink research at the Game Conservancy Trust
The Game Conservancy Trust has developed a novel method of detecting and trapping Mink. Permanent floating rafts lined with damp clay are set at roughly 1 km intervals along rivers and checked on a regular basis. Only those that show signs of being visited by Mink (who hopefully leave evidence in the form of footprints in the clay) have a live-capture trap set on them which is then checked daily. This method greatly reduces non-target animal captures, increases trap efficiency and saves a considerable amount of time input. In one study area every breeding female Mink was trapped and Water Voles have reaped the benefit (Conservation News British Wildlife 15(2) December 2003). Further details on this method of Mink control can be found on the Game Conservancy Trust web site at www.gct.org.uk/research/mink.

Stoat *Mustela ermina* (1,3,4,10)
Just three records this year, all from the Chew Valley area. A stoat was seen on 14 June carrying prey near West Harptree (5657) and another seen in the same location in July dead on the road. On 30 July one was seen crossing the road at Hollow Brook, Chew Valley Lake. (All recorded by DW.)

Weasel *Mustela nivalis* (6,7,3,10)
A Weasel was seen on Blackdown (4957) hunting along a stonewall on 21 March. All the other Weasels were seen crossing roads (4674, 6059, 6388 April – June). An interesting record was made on 30 June near Marshfield where four Weasels were seen crossing the road (7975). One Weasel was caught in a Longworth small mammal trap (4573); see The Small Mammals of Clapton Moor Nature Reserve above.

Recorded by PJC, PGF, JR, DT.

European Polecat *Mustela putorius* (0,2,2,?)
No confirmed records for the year.

The Mammal Society and Vincent Wildlife Trust (VWT) launched a three-year Polecat distribution survey of Britain starting in January 2004. The aim is to confirm the presence in as many 10km squares as possible over the three year survey period and it is expected to confirm a significant expansion in the Polecat's range since the last survey finished in 1997. Further details about the survey can be found on the VWT web site at www.vwt.org.uk (Mammal News 136 Winter 2003-2004).

Otter *Lutra lutra* (19+,25,2+,24)

Otters in North Somerset
The North Somerset Otter Group undertook regular surveys of the watercourses in North Somerset in 2003. The following information has been summarised from the North Somerset Otter Group newsletters Issues 12, 13 and 14.

In February Otter signs were found on the Congresbury Yeo from Blagdon through to Congresbury. Spraint and prints were found on the Oldbridge River on Puxton Moor and further down towards the M5. Spraint was found on the River Kenn and around south Nailsea. Two sightings of a mother and two cubs on the Blind Yeo in Clevedon together with spraint from the same area. Spraint was found on the Clevedon Moor section of the Blind Yeo as well as on the Yearling Ditch. The Middle Yeo on Tickenham Moor was also positive. A large quantity of spraint and anal jelly was found on the Land Yeo in Nailsea. Footprints were found in Flax Bourton together with a sighting and spraint at barrow Gurney. Spraint was found under a road bridge on a rhyne running into the River Banwell and the farmer reported seeing an Otter on the River Banwell itself. There were even unconfirmed reports of Otter spraint on Walton Moor in the Gordano Valley.

The May survey produced Otter signs from the Land Yeo, Blind Yeo and River Kenn. At least four Otters are thought to be in the area (fresh spraint was found in four different locations on the second day of the survey).

The August survey, despite head high nettles and thistles, produced a few records with the usual signs on the River Kenn. Fresh signs were also seen on the Oldbridge River, the Land Yeo around Nailsea and near Bathing Pool Woods. There were also positive signs from Blagdon Lake and on the Waywick Rhyne running under the M5 at Junction 21 (Weston-super-Mare).

In November, Otter signs were reported from the Land Yeo between Nailsea and Wraxall, the River Kenn near Midgell Farm, the Blind Yeo on the southern edge of Clevedon and around Blagdon Lake.

In mid-November an Otter was run over on a road near Congresbury and at about the same time two Otter cubs were found wandering into gardens and onto the A38. One cub was taken into care at Secret World Wildlife Hospital.

Otters on the Bristol Avon in 2003

Otters continue to do well on the Bristol Avon and its tributaries with positive signs, sighting etc from the following locations (information summarised from Bristol Avon Otter Survey reports for August and November 2003 and for February 2004 by Simon Reece.

By Brook

Common Hill Weir (8374) – spraints; Box Mill and Water Garden (8268) – spraints; Middle Hill Gauge (8168) – spraints; Shockerwick Bridge (8068) – spraints; Bathford Bridge (7867) – spraints.

Corston Brook*

Upper Lake/Middle Weir/Lower Weir (6964) – spraints; A4 Road Bridge (6965) – spraints; Railway Bridge (7065) – spraints/padding.

Mells Stream

Edford Wood (ST6648) – spraints; Mells Bridge (ST7248) – spraints; Mells Pond (ST7348) – spraints.

River Avon*

Bathampton Oxbow (7867) – spraint and padding; Boat House Road Bridge (7265) – spraints/padding; Kelston Park/Corston Brook Foot Bridge (7065) – spraints/padding; Lockkeeper Keynsham (6569) – spraints. Staff at the Environment Agency office, Lower Bristol Road, Twerton (7264) regularly saw an Otter on the River Avon between 3 and 22 December (RT).

River Boyd*

Old Mill Weir (6871) – spraints

River Chew*

Hollow Br. Lake Bridge (5860) – spraints/padding; Denny Lane and Flume (5761) - spraints/padding; Stanton Drew Bridge (5963) – spraints/padding/digging; Bye Mills/Pensford Road Bridge/Pensford Weir & Mill (6163) - spraints/padding/digging; Publow Bridge (6264)- spraints;

Woollard (6364) – padding/digging; Compton Dando Bridge (6464) – spraints.

River Frome
Spring Gradens (7749) – spraints/padding/digging; Snarlton Farm (8157) – padding
Freshford Mill (7859) – spraint.

Sherston Avon
Fosse Way Bridge (8987) – spraint

Siston Brook*
Londonderry Wharf (6669) – padding

Wellow Brook*
Upper/Middle and Lower Weir (7357) – spraints; Bridle & Sleeper Bridges (7559) – spraints/padding.

* = Rivers in the old county of Avon.

A dog Otter was killed on the road near Barrow Gurney on 1 July. An Otter was seen regularly at Bathampton between October and December. Another (probably a dog Otter) was seen at 4.00 a.m. on 21 November in the fisherman's car park at Barrow Tanks by WPC McDonald and PC Bradley. It was last seen successfully crossing the A38!

Fourth National Otter Survey
The fourth National Otter Survey (2000-2002) has confirmed the expansion in the Otter's distribution observed since the first survey between 1977-79 has continued (Environment Agency 2003). There was a rise in the number of sites with Otter signs in all 12 regions surveyed. Two areas, Thames and Anglian regions, have benefited from the introduction of Otters into local rivers as part of conservation programmes whereas the substantial rise in the Trent catchment is due almost entirely to natural re-colonisation.

Positive sites/total	1977-79	1984-86	1991-94	2000-02
Bristol Avon	0/15	0/15	0/15	1/15
River Parrett	0/22	0/22	3/22	12/22
Brue and Axe	2/15	1/15	4/15	7/24
North Somerset Streams	0/0	0/0	0/0	4/12
West Somerset Streams	0/15	0/15	9/15	13/15
Hampshire Avon	0/22	0/22	0/22	4/22
Frome, Piddle, Pole and	0/9	0/9	1/9	1/9

Purbeck				
Dorset Stour	0/39	0/39	11/39	19/39
West Dorset	0/14	0/14	1/14	7/14

Table 3 Number of Sites with Evidence of Otters for each of the seven LEAPs in the Wessex Region.

Since the 1991-94 survey there has been a 121% increase in positive sites in the Wessex Region. The eastward expansion of Otters from the South West Region appears to be continuing and Otters are now widely but sparsely spread across the Wessex Region with breeding taking place on several catchments. On many watercourses however, Otters are still rare or absent despite apparently suitable habitat and good fish stocks. The Wessex region is probably one of the most important areas for Otter conservation in England, linking the healthy Otter populations of the South West with the much parser populations of Southern and Thames Regions, the lower Severn Valley and the expanding populations on the rivers of South Wales.

Badger *Meles meles* (31,50,42,77)
Records of road casualty badgers from the following 1-km squares: 4271, 4469, 4562, 4673, 4766, 4972, 4975, 5065, 5481, 5484(3), 5568, 5585(2), 5665, 5789, 5862(2), 5887, 5960, 6378, 6388, 6578, 6673, 6783, 6982, 6990, 7092, 7285, 7578, 7757, 7978.

Other Badger records: 4269 (one seen running along road), 4470 (dung pits), 4472 (latrines containing damsons and other fruit and a dug out wasps nest), 4569 (one crossing road), 4569 (footprints in mud), 4573(2) (dung pits and an adult seen), 4575 (one crossing road), 4673 (dung pits), 6071 (adult seen in garden), 4770 (reported to be digging a sett under the dipping platform at Stockway North Nature Reserve in Nailsea), 5469 (active main sett), 7074 (latrine), 7476 (latrines).

Recorded by RLB, PJC, KG, J&S P, JM, JR, LR, TS, DT, MT, LW.

Jeff Rawlinson reports from his garden in Pilning (5585) from April 2003:
17 April – one feeding on peanuts at 9.00 pm; 21 April – one feeding on peanuts at 9.05 pm; 30 April – one feeding on peanuts fled when Fox approached; 2 May – two arrived together at 9.10 pm with a Fox; 6 May – first badger arrived at 9.30 pm, second at 9.35 pm; 7 May - one arrived at 9.32 pm; 9 May – two feeding at the same tray, 9.45 pm; 23 May – one arrived at 9.45 pm; 2 June – two arrived at 10.15 pm; 4 June – two arrived at 9.45 pm; 5 June – one at 9.45 pm, two at 10.05 pm and one at 10.10 pm.; 9 June - three feeding; 12-17 June – three feeding daily, accompanied by four Foxes; 20 June – six feeding,

accompanied by five Foxes; 23 June – three feeding with three Foxes; 25 June – four feeding with two Foxes; 26 June – one feeding 9.20-9.55 pm; 29 June – three feeding; 30 June – two feeding; 3 July – one arrived at 10.20 pm; 4-8 July – up to two daily; 9-14 July – up to three daily, 9.40 pm was the earliest arrival time; 17 July – three arrived at 9.30 pm; 18 July – three arrived at 10.00 pm; 19 July – three arrived at 9.30, another three at 9.45; 20 July – three; 21 July – first arrived by 9.40 pm, six in total by 10.15 pm; 12 August – seven observed at 9.45 pm; 14 August – one already feeding at 9.20 pm when the second one arrived; 26 August – three at 8.55 pm, seven by 9.05 pm; no more sightings recorded.

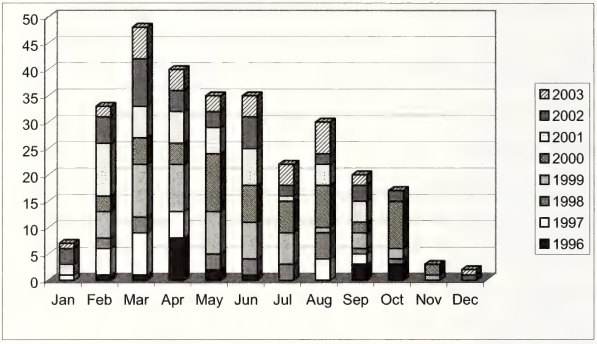

Figure 6. Number of Badger Road Casualty Records 1996-2003

Eight years of Badger road casualty figures with 292 records to date show a large peak around March/April (peak breeding season) with a smaller peak in August (dispersal of young) (Fig 6). There are also few records for November and January. This is the time of year when Badgers are at their least active with the pregnant females underground in their setts prior to giving birth to cubs between January and March.

Badger research

Accurately assessing Badger population densities has always been a difficult and time-consuming process, involving repeated live-trapping and mark-recapture. A new technique has been developed by Gavin Wilson of the Central Science Laboratory and others involving the extraction of DNA from Badger faeces as a means of generating genetic profiles of the animals. At the study site in Gloucestershire, twenty different individuals were reliably identified and their studies showed that latrines were used equally by males and females and by

Badgers with ages ranging from cubs to nine years. The DNA technique is likely to be a valuable research method for future Badger research (Wildlife Reports British Wildlife 15(1) October 2003, Wilson et al 2003).

Badger Licensing

A consultation was announced in October on a "Review of Badger Licensing Procedures for England". Defra said, "We believe that the current legislation offers the necessary protection of Badgers – balancing the reasonable expectations of both those suffering significant problems with Badgers and those concerned with animal welfare. We are not seeking to alter the Act itself. However, it is right that Defra reviews its internal procedures on the implementation of the licensing requirements of the Act. This will help ensure that the procedures we use are appropriate and efficient and that we are as open about them as we can be." Comments on this were required by February 2004.

Defra reported that nationally in 2002, 784 applications for licences were received under the Protection of Badgers Act 1992 (254 more than in 2001, although that year's data is incomplete, and 644 licences were granted. 378 were to prevent 'serious damage', one to prevent 'spread of disease', 91 for 'agricultural operations', 88 for 'forestry operations' and 80 for 'maintenance of water courses/drainage'. The action authorised was to interfere with the sett in 642 cases, to kill Badgers in one case and to euthanase captive Badgers in one case. (Defra Wildlife and Countryside webpage, 15 September 2003).

Badgers and Bovine Tuberculosis

The culling of Badgers in the reactive-treatment areas of the Randomised Badger Culling Trial was halted in November 2003 when it was found that there had been a 27% increase in the numbers of cases of bovine TB occurring in reactive-culling areas compared with areas without culls. Researchers believe that culling may encourage Badgers to move between territories, helping spread the disease. There is now no doubt that Badgers are implicated in the spread of bovine TB, a view accepted by the National Federation of Badger Groups. Nevertheless, movement of cattle is still considered an important route of transmission (Conservation News British Wildlife 15(2) December 2003).

Fox *Vulpes vulpes* (48,39,35,71)

Records of Foxes found dead on the road in the following 1 km squares (* = 'Bristol' Foxes): 4170, 5381, 5469, 5484(3), 5585, 5586, 5887, 6160, 6378, 6470, 6479, 6894, 7285, 7964.

Live Foxes were seen in the following one kilometre squares: 3158, 4469, 4472 (seen on several occasions during the year), 4476 (adult with three cubs – 26 July), 4570 (fox cub 6 July), 5180(adult with two cubs – 17 June)*, 5379*,

5382(2), 5481, 5584(female examining road-kill), 5674*, 5684(4), 5758 (female and three cubs – 15 April), 5760 (two adults and three cubs seen on the shore of Denny island – 17 August), 5776(2)*, 5777 (wearing collar)*, 5859 (female and two cubs seen regularly – April/May), 5874 (2)*, 5876*, 6082, 6165 (two cubs seen playing outside den – 10 May), 6194, 6372(2)*, 6661 (two cubs – 30 May), 6883 (in poor condition), 6964, 7572 (one cub – 22 August), 7576 (four cubs – 20 July), 7577, 7774 (two cubs – 6 May), Chew Valley Lake (east shore) – one seen in reed bed probably suffering from Otitis media, an infection of the middle ear (associated with mange).

Foxes were seen regularly in the Narroways Hill area of St Werburghs (5974*/5975*/6074*/6075*) during the year. Sightings included a Fox heard barking on 6 January, several sightings on the allotments in February, a large Fox seen in Lynmouth Road in April, one seen at mid-day on the railway embankment in May, in Coburg Road in October and again seen and heard on the allotments in November and December.

It is interesting to see, following the mange outbreak in Bristol that Foxes are being seen more regularly in the city. As two recorders from the Redland/Cotham area of Bristol commented, "It was the first I have seen for many years/ages."

Recorded by EB, RLB, PJC, PGF, RJ, HP, J&S P, JR, NMGT, DT, ET MT, DW.

Jeff Rawlinson reports from his garden in Pilning (5585):
January - signs of Foxes; February – juvenile found dead in garden, April - adult seen feeding most days until mid-May; 13 May – two very small cubs seen feeding on peanuts; 19 May – adult and four cubs seen eating and playing; 23 May – adult and two cubs seen; 23 and 24 May – one feeding at peanut tray – a nearby Magpie did not like this and pecked at the Fox's rear, after 15 or so pecks, the Fox turned on the Magpie, which then flew off; 17 June – adult and three cubs; 23 June – two adults and three cubs; July-December – usually just one Fox seen occasionally.

Foxes in the press
'Foxes dumped in the countryside' (Bristol Evening Post 1 April 2003), 'The Urban Fox' (Soap Box, Bristol Evening Post 7 April 2003). Stories of urban Foxes from Bristol being caught and dumped in the countryside, sometimes as far afield as East Anglia, continue to be reported. Farmers and other rural workers are complaining that pest control companies are releasing the urban animals under cover of darkness and that the Foxes are spreading disease and threatening livestock. The Union of Country Sports Workers, a pro-hunting

organisation, announced that they were conducting a survey to find out how widespread the 'problem' was. Trevor Williamson the director of the Fox Project, a sanctuary in Kent and John Bryant of the company Humane Urban Wildlife Deterrence based in London have both had long-standing offers of up to £1,000 for anyone who can produce evidence for the mass release of urban Foxes in the countryside. To date nobody has come forward to claim the reward!

ARTIODACTYLA (deer)

Red Deer *Cervus elaphus* (0,1,0,1)
No records for the year outside deer parks.

Roe Deer *Capreolus capreolus* (33,27,20+,51)
Records from the following 1 km squares: 2859 (Brean Down), 4364, 4373 (up to two seen regularly – Walton Moor), 4573 (three bucks and two does seen 25 May at Clapton Moor Nature Reserve), 4758, 4766 (buck dead on road), 4858, 5469 (dead on A370), 5573, 5958, 6059 (two does and a buck), 6170(2), 6277(dead on road), 6371, 6462 (doe with fawn – 28 May, seen again 24 June doing well; also a further doe with two fawns seen on 24 June), 6561(2), 6563, 6570, 6662, 6761, 6764 (five seen in field – 27 December), 6784 (three observed moving across field), 6864 (three does), 6964(2), 7069, 7472, 7574, 7577, 7684 (adult with two fawns – 21 June), 7685, 7780 (two seen in cereal crop), 7974, 7975 (adult and juvenile – 25 August).

David Warden writes, "The population of Roe Deer on Bristol Water land at Chew Valley Lake is estimated at not less than 20, with up to seven seen together. Deer are present on Denny Island (5760) where they have bred regularly with up to four present in the spring."

Edward White (EWh) reported seeing a large, dark coloured buck at the edge of the wood near Racecourse Farm, Portbury. A doe, seen near Failand House Farm, a week later was a much lighter colour. He also submitted two other records of deer on the coast path between Clevedon and Redcliff Bay and near Failand Farm.

Keith Giles reports on observations of Roe Deer around his house and the adjoining Wildlife Trust Reserve (4472 – Tickenham) where he is voluntary warden:
"The Roe Deer numbers seem to vary through the year with highest numbers in late winter and spring.
January – up to 6 deer present. Bucks beginning to change colour and antlers

beginning to appear.
February - up to five deer present.
March – at least three bucks and three does present. Bucks starting to lose velvet towards the end of the month and all traces of velvet have gone by mid-April.
April – at least four bucks present (identified by different shaped antlers and degree of velvet loss). Last year's doe fawns are still with their mother. Bucks "mark" their "territory" by rubbing their scent on trees and bushes at the end of the month. The bucks seem to move around a lot.
May – three bucks present. One doe had a single fawn and another had twins (later found to be a buck and doe).
June – two/three does and two bucks present but only two fawns.
July – two does and two fawns and two bucks were seen.
August – two bucks, one doe and two fawns seen.
September – one doe with two fawns and one buck present.
October and November – there were infrequent sightings of deer over this period. A doe with two fawns was sometimes seen.
December – up to four deer were seen in the distance but ages/sexes were not obvious. A doe with two fawns was sometimes seen.
I have a long list of plants, shrubs and trees eaten by Roe Deer. I have compiled a shorter list of plants that are not eaten by them (to date)! The latter plants are often those with highly aromatic leaves such as rosemary, Lavender, Sage or strap-shaped leaves. However, even with these, flower heads may be eaten. Daffodils and Snowdrops seen to be unpalatable to the deer but a large proportion of Bluebell flowers are eaten."

Recorded by RLB, DB, PJC, PGF, JG, JR, LR, DT, MT, DW, EW.

Fallow Deer *Dama dama* (1,0,0,0)
An adult (no antlers) observed near Farrington Gurney (6255) on 3 June. (JR).

Chinese Muntjac Deer *Muntiacus reevesi* (3,1,?1,0)
A Muntjac was spotted in Castle Park (5973) in the centre of Bristol and then seen jumping off Bristol Bridge into the floating harbour. It was rescued from the Floating Harbour near Redcliff Wharf and taken to the RSPCA clinic in Albert Road (Bristol Evening Post 20 September 2003).
Several sightings from the Thornbury area (6390) up to April 2003. One seen at Hicks Gate (6469) in June.
Recorded by JR, JW.

Deer Collisions
The Deer Initiative launched a three year project to investigate the number of deer related road traffic accidents in England and Wales. It is estimated that

between 30,000 and 50,000 deer are killed on the roads each year, resulting in several hundred human injuries and some fatalities. The key objectives of the study are:

To develop a well-stratified, nation-wide system for collection of standardised information on deer related RTAs (road traffic accidents) from all relevant sources in England and Wales

To investigate such aspects of deer behaviour and deer management which may affect accident risks and the effectiveness of differing mitigation measures. On that basis make recommendations regarding potential improvements in the design, installation and maintenance of deterrents aimed at reducing accidents.

Further information on the project can be found at- www.deercollisions.co.uk

EXOTICS

A recently established feral population of Wild Boar Sus scrofa was studied in Dorset (Wilson 2003). Records were obtained from 49 one-kilometre squares and the population seemed to have originated from escapes from farms as long ago as 1994. Retrospective census suggested that the population peaked at a minimum of about 30 animals in 1998 but the pre-breeding population has probably remained at fewer than 20 animals.

There was an unconfirmed report of two Wild Boar in Bath and North East Somerset (BRERC Wildlife June 2003).

Winter Mammal Monitoring Project

The first year of the Mammal Society/British Trust for Ornithology has been completed (British Wildlife 14(4) April 2003). Several species showed distinct regional patterns of abundance. Red Deer and Roe Deer were seen in a greater proportion of 1 km squares in Scotland, Grey Squirrels and Rabbits were found more in English squares, Brown Hares were seen more frequently in the north of England and Fallow Deer and Muntjac more often in eastern England. Foxes were most frequently recorded in western England and Wales. Habitat data showed that Roe and Fallow Deer and Grey Squirrels were more likely to occur in woodland areas; Brown Hares and Rabbits were associated with arable areas. The Winter Mammals Monitoring Project is continuing and over the years any trends in mammal distribution and abundance may become apparent.

Conservation

The State of Britain's Mammals 2003
This second update reported on biodiversity actions plans and other matters (Macdonald and Tattersall 2003). Of 15 Species Action Plans (SAPs) for mammals only six during the 2002 reporting round were either achieving targets or were on schedule. For seven species lack of knowledge of those species, their population trends and lack of funding were seen as major constraints. Some SAPs were proving to be very costly, the Otter SAP had cost over £1.5 million. The Dormouse was seen as a success story – all 18 actions in the SAP were under way, monitoring was in progress and re-introductions seemed to be successful so far. Fifteen actions in the Harbour Porpoise SAP had been enacted but crucial items such as the introduction of Special Areas of Conservation had not yet been endorsed. The Greater Horseshoe Bat SAP had made good progress, a network of SACs had been proposed and uptake of the Defra Countryside Stewardship Scheme to provide foraging habitat and corridors was encouraging. The national population trend for Brown Hares was reported as stable. Any decline was likely to be as a result of habitat loss.

The report said that in 2002 almost 4000 seals had been reported dead around the UK in the latest phocine distemper virus epidemic.

Tracking Mammals Partnership
This partnership was launched on 16 July 2003 as a collaborative initiative involving 23 organisations with a variety of interests in UK mammals that aim to improve the quality, quantity and dissemination of information on the status of mammal species in the UK. A co-ordinated approach to the surveillance and monitoring of mammals was welcomed. The Tracking Mammals Partnership included the majority of organisations in the UK with mammal interests. The Partnership was implementing the recommendations of two scoping studies, assisted by the experience of effective bird monitoring in the UK, gained over the last 30 years. Data on ongoing population changes of mammals was being collected through a programme of annual surveys, run by organisations in the partnership, with the help of a nationwide network of volunteers.

Legislation

Attempts to ban hunting with dogs continued in 2003. A Bill intended "to prevent all cruelty associated with hunting with dogs" was published in December 2002 and completed its Committee stage on 27 February 2003. A six-month consultation process followed to find as much common ground as possible. Hearings of expert evidence were held in September.

In September Defra issued a Consultation Paper seeking views and suggestions regarding the use of all snares under Section 11 of the Wildlife and Countryside Act 1981 and traps under Section 8 of the Pests Act 1954.

The Joint Nature Conservation Committee (JNCC) has recommended to government that the Water Vole receives full protection under Schedule 5, Section 9 of the Wildlife and Countryside Act 1981. Currently they are listed on Schedule 5, Section 9 (4) of the Act – meaning that at present only the places that Water Voles occupy or use for shelter are protected, whereas the animals themselves are not protected (Mammal News 133 Spring 2003).

Beasts

'Big cat report to go to No. 10' (Cornish Guardian 17 July 2003). The Plymouth based British Big Cats Society reported that it had 'strong and convincing evidence' to prove the existence of non-indigenous wild beasts roaming the countryside. A dossier including 3,000 witness statements and around 10 pieces of photographic evidence was to be presented to Downing Street sometime in August and then given to the police and Defra. Further information on alleged big cat sightings can be found on the BBCS web site at www.british-bigcats.org.

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REFERENCES

Baker, P.J., Ansell, R.J., Dodds, P.A., Webber, C.E. and Harris, S. (2003) Factors Affecting the Distribution of Small Mammals in an Urban Area. Mammal Review 33(1): 95-100.

Environment Agency. (2003). The Fourth Otter Survey of England 2000-2002.

Laurence, S. (2003) The Savernake Tunnel – an important hibernation site for bats. British Wildlife 14(4): 234-240.

Longley, M. (2003). The Greater Horseshoe Bat Project: a species conservation success story. British Wildlife 15(1): 1-6.

MacDonald, D. and Tattersall, F. (2003). The State of Britain's Mammals 2003. Mammals Trust UK.

Parsons, K.N. and Jones, G. (2003). Dispersion and habitat use by Myotis daubentonii and Myotis nattereri during the swarming season: implications for conservation. Animal Conservation 6:283-290.

Perrow, M. and Jowitt, A. (2003). Wetlands as an important habitat for small mammals. British Wildlife 14(3):171-179.

Sabin, R.C., Jepson, P.D., Reid, R.J., Chimonides, P.D.J., Deaville, R., Patterson, I.A.P. and Spurrier, C.J. (2003). Trends in cetacean strandings around the UK coastline and marine mammal post-mortem investigations for the year 2002. Natural History Museum Consulting. Report for Defra.

Wickramasinghe, L.P., Harris, S., Jones, G. and Vaughan, N. (2003). Bat activity and species richness on organic and conventional farms: impact of agricultural intensification. Journal of Applied Ecology. 40:984-993.

Wilson, C.J. (2003) Distribution and Status of Feral Wild Boar Sus scrofa in Dorset, Southern England. Mammal Review 33(3): 302-307.

Wilson, G.J., Frantz, A.C., Pope, L.C., Roper, T.J., Cheeseman, C.L. and Delahay, R.J. (2003). Estimation of badger abundance using faecal DNA typing. Journal of Applied Ecology 40: 658-666.

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Red Squirrel *Sciurus vulgaris*

Proceedings of the Bristol Naturalists' Society (2003) 63:106-107

Fungus Report for Avon 2003

Justin Smith

2003 proved to be one of the worst autumns in 25 years for fungus recording, in the authors' experience. Warm, wet weather in late July, produced a brief flush, followed by nearly 3 months of dry conditions, detrimental to fungus fruiting.

Forays in September and October produced less than 20 species on normally favourable sites, which resulted in many 'black crusty microfungi' being recorded, to increase the count and to retain interest from the forayers. November proved to be slightly better, but still with many normally common genera - ***Lactarius, Russula, Amanita, Lepiota, Hygrocybe, Entoloma*** being very poorly developed. Needless to say, this season carried right on into January despite the frosts!

In February, many sites produced excellent flushes of both 'Scarlet Elf Cup' fungi, ***Sarcoscypha austriaca*** and ***S. coccinea***, with the former being found to be the most common. They differ, primarily, by the hairs on the outer surface of the fruitbody (microscope!): ***S. coccinea*** has straight to slightly sinuose hairs, while those of ***S. austriaca*** are distinctly sinuose-coiled. Both species are found scattered in Dowlings Wood.

Later in the year, fungal fruiting was mostly of common species, though a few interesting, rare or potential new Avon records were encountered:

Agaricus bernardii, found by Roy Betts, produced a drought tolerant flush in the churchyard of Walton in Gordano in late September.

Cortinarius sodagnitis, discovered by Andy Groves at Browns Folly in October, could be easily confused with the more common Wood Blewit (***Lepista nuda***), but the former species has rust brown spores as a pose to pink spores, and stains reddish-purple in KOH on the cap skin.

Cryptosphaerina fraxini, an ascomycete, on ash twigs at Ashton Court Meadow (2nd march 2003)

Flammulaster subincarnata (a 'small brown job') appeared on Juncus stems at Max Bog (30 June 2003), as did ***Mycena bulbosa***.

Helvella stevensii, an Elf's Saddle, was found in Dog's Mercury in Dowling's Wood (12 August 2003).

Inocybe margaritospora had an early flush at Weston Big Wood and Dowlings Wood (10th + 12th August 2003). This species is typified by light colours and nodulose spores.

Lepiota oreadiformis appeared in the calcareous grasslands of Walton Common (it has occurred regularly here for the last 8 years) and Dolebury Warren (4th - 20th August 2003).

Melanelia (Parmelia) exasperata, a lichen, I've mentioned here for interest, because it is apparently a declining species in the UK, but not in the west of Britain. Some of the oaks in the Dolebury hill fort hold substantial populations.

Mycena rubromarginata was found in birch debris at Ashton Court Meadow (3rd November 2003). Typically, it has a reddish gill edge.

Phylloporia ribis, a bracket fungus, turned up on spindle at Tickenham Hill (12 March 2003).

Psathyrella nolitangere, a 'brittle cap', was encountered on Typha/Phragmites /Epilobioum debris at Littleton Brickpits (26 August 2003).

Scutellinia subhirtella, an overlooked 'Eyelash Fungus', was found on willow debris at Littleton Brickpits (26 August 2003).

Overall, a bad year for the mycologist. The author was reduced to collecting mildews in September and October to supplement records. All recorded species are nationally common, but many may constitute new Avon records, due to their under-recording! There is some hope in these drought years after all!

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Botany Section Report 2003

BNS Botany Meetings 2003

20 Jan	AGM and Members meeting	
24 Feb	Earthwatch Expedition to Kenya	Liz McDonnell
15 March	Bryophyte meeting at Midger Wood	Peter Martin
24 March	Wye Valley Woodlands	George Peterken
13 April	Purple toothwort in Blaise Castle Estate	Tony Titchen
24 May	Lords Wood, Pensford	Tony Titchen
8 June	Bath Asparagus – Our local speciality	Barbara Price
20 June	Preparing Herbarium Specimens Workshop	Liz McDonnell
5 July	Arable weeds near Tormarton	Phil Quinn
16 Aug	Botanising west of Cribbs Causeway	Mark & Clare Kitchen
7 Sept	Ferns around Glen Frome, Bristol	Tony Smith
27 Oct	Extinction in Paradise: helping to save Turkey's Plant life	Andy Byfield
24 Nov	Native British Trees	Tony Titchen
29 Dec	KwaZulu Natal Ecology	Pam Millman

Section Activities

Local Change
This BSBI initiative is running for two years with the aim of recording tetrads previously surveyed in 1987-88. The tetrads selected are A, J and W in one-in-nine hectads, the same as those selected before.
In all we held 11 meetings in the 10k square ST66, covering each tetrad in each month from May to August. As a result we have been able to submit 1200

records (the final total will be lower after I have sorted out duplications). This is done using Mapmate which is then co-ordinated nationally.
BSBI members have been asked to participate in this, giving ten hours of field recording time in each tetrad. The emphasis is on recording in pairs or groups to provide opportunities for less experienced recorders to work with those having more experience. BSBI members on our committee felt this would be a good opportunity to encourage BNS members to add to their identification skills.

BRERC
We liaise with the Records Centre sending our plant records annually. We also have members doing data entry at the centre on a regular voluntary basis.

Rare Plants Groups
Members are active within both the Somerset and Gloucestershire groups, working on the current status of Rare Data Book and Nationally Scarce Plants, many from records in old floras.

Leigh Woods Management Plan
Along with other sections of the BNS we submitted a response to the plan for 2003-4.

On a 'fun day' at the Avon Gorge and Downs Wildlife Project we were represented by a heavily disguised Bristol Onion: a show stopper!

Report of the Invertebrate Section, 2002

Ray Barnett and Tony Smith were elected Honorary President and Honorary Secretary respectively at the AGM held on 20th January 2002 at the City Museum & Art Gallery, Bristol. The President proposed that the Section concentrate on recording at Leigh Woods, as it had done between 1977 and 1982, in order to build up current knowledge on this historically very important site for invertebrates. One aim would be to discover whether species known from older records are still present.

Two indoor meetings were held as follows:

20th January	Section AGM
23rd February	Hoverfly identification workshop, David Gibbs

The following field meetings were held:

13th April	David Gibbs *Leigh Woods – The search for* Phorbia nuditibia
26th May	Tony Smith and Ray Barnett *Leigh Woods – general invertebrate recording*
14th July	Tony Smith and Ray Barnett *Leigh Woods – general invertebrate recording*
29th September	Linda Gregory *Leigh Woods – spider recording*

Errata to Invertebrate Section Report 2001: The meeting proposed on 1st July as a Dragonfly meeting, joint with the Cam Valley Wildlife Group, did not actually take place. Apologies to the Cam Valley Group.

Report of the Invertebrate Section, 2003

Ray Barnett and Tony Smith were re-elected Honorary President and Honorary Secretary respectively at the AGM held on 1 February 2003 at the City Museum & Art Gallery, Bristol. The President proposed that the Section again concentrate largely on recording at the Avon Gorge, Leigh Woods and Bristol Downs, as in 2003, in order to build up current knowledge on these historically, very important sites for invertebrates. In addition, it was proposed that the membership be asked to specifically look out for four distinctive species in the district as a whole, namely the Rose Chafer beetle *Cetonia aurata*, the Cistus Forester moth *Adscita geryon*, the Forester moth *Adscita statices* and the Land Shrimp *Arcitalitrus rorrieni*.

Two indoor meetings were held as follows:

1st February	Section AGM
12th March	Dr Jane Memmott *An Entomologist at Large*

The following field meetings were held:

30th March	Ray Barnett & Tony Smith *Spring hoverflies & insects on Durdham Down.*
18th May	Tony Smith *Durdham Down, molluscs and other invertebrates.*
13th July	Ray Barnett and Tony Smith *Glow-worm hunt, Old Down.*
17th August	Tony Smith *Durdham Down, leaf & froghopper hunt.*
14th September	Francis Farr-Cox *Spiders! Leigh Woods.*

Bristol Naturalists' Society
Minutes of the 79th AGM of the Ornithological Section of the B.N.S.

The meeting was held at 7.00pm, on Friday 17.1.03, in the Westmoreland Hall. The Acting President, Mr Richard Bland, took the chair; 39 members were present.

1 The Acting President, Richard Bland, welcomed members to the meeting. Apologies were received from E. Drewitt, J. Lance, H. New, R. Symes and from H. Rose (who would be late in arriving).

2 **Minutes** The minutes of the 78th AGM were read. The minutes were agreed by all who had been present (proposed P Chadwick, seconded by D Lott) and were signed by the Acting President.

3 **Matters from minutes.** None that would not be dealt with later.

4 **Secretary's report**. The secretary, Mary Hill, read her report concerning the year's activities. A copy is attached. Acceptance was proposed by D Cullen, seconded by S M Taylor and carried *nem con*.

5 **Treasurer's report**. The treasurer, Mary Hill, presented a summary of the Current Account which had been audited by Trevor Silcocks. A summary is attached. Acceptance of the accounts was proposed by S M Taylor, seconded by D Cullen and carried *nem con*. Mary Hill said that the money in the 'special fund' now amounted to £925.73. Richard Bland outlined the history of this fund, and said that the Society Treasurer had urged the section to state the purpose for which this money was being saved. Richard suggested that we state that we hope to produce an Aviforna met with general approval; it will be discussed further by the committee.

6 **Election of officers** The Acting President, Richard Bland, explained that once again there was no candidate for the presidency although he had made efforts to obtain one. He said that he would, again, continue as acting president, and that he and the committee would continue to seek a replacement. Mary Hill was happy to continue as Secretary and Treasurer.

7 **Election of committee**. The Acting President thanked all the members of the committee for their hard work during the past year. Paul Farmer was retiring, having contributed a great deal over the last 4 years, it was hoped that he would continue to lead field meetings in future.
Present committee members happy to be re-elected were -, Brian Tizard, Mike

Taylor, Matthew Rogers, Joyce Callard and Angela Levinson. The committee proposed three new members, Ed Drewitt and Ann and Richard Crawford; they had all agreed to serve. There was room for two other members on the committee.

The committee's suggestion for membership in 2003 was proposed by the committee, seconded by A Wookey and carried *nem con*.

The Acting President said that the committee would welcome ideas for future lectures and field meetings.

8 **AOB**

As **Society President**, Anne Wookey thanked the committee and officers, especially Richard Bland, for their hard work. She also thanked those members of the section who had been regular in their attendance on Council for their support during her term of office (which was about to end). She had enjoyed her presidency.

As **membership secretary,** Anne Wookey, urged those who had not paid their subscriptions to do so - half the membership had paid for 2003.

Forthcoming events. The Acting Section President reminded the section of forthcoming field meetings and lectures.

There being no further business, the AGM was closed at 7.27pm.

Bristol Naturalists' Society
Report of the Ornithology Section 2003

At the 79th AGM. on January 17th 2003 no President was elected – the Committee had, yet again, been unable to find a candidate who was willing to stand. Richard Bland agreed to continue, as Acting President, whilst a new President was actively sought. Mary Hill was re-elected as Secretary/Treasurer. Ann and Richard Crawford and Ed Drewitt were elected to the committee, where they joined the re-elected members, Joyce Callard, Alison Levinson and Mike Taylor and Brian Tizard.

Lecture meetings

There were 6 lecture meetings in 2003 and they are listed below. The lectures were informative and well illustrated; they were well attended - although not so well as in 2002. The average attendance was 38.5 (c.f.47.33 in 2002)

Ornithology Section Lectures in 2003

January 17th	AGM + Harvey Rose	'Clevedon Bay; the last 25 years'
February 12th	Bob Medlar	'Birds of Malawi'
March 14th	Paul Chadwick	'Birding in Norway'
October 17th	Hugh Boyd	'Then, now and what next? British ornithology 1940 - 2040'
November 12th	David Ballance	Birds from Cargo Ships
December 5th	Terry Bond	Birds of Southern Europe

There were 16 field meetings, average attendance 9.63

First winter session 2003 (3 walks)

January 23rd	Slimbridge	Trevor Evans and Dave Paynter
February 22nd	Uphill	Don Cullen
March 29th	Sand Point	Paul Farmer for Barry Gray
Average attendance, first winter session		10.0

Summer 2003 (10 walks)

April 10th	Leigh Woods	Richard Bland
April 26th	Forest of Dean	Ed Drewitt
May 10th	Puxton Moor	Brian Tizard
May 15th	Newton St Looe	Paul Farmer
May 21st	Frome Valley	Richard Bland
June 4th	Hawkesbury	Richard Bland
June 17th	Folly Farm	David Warden
July 2nd	Marshfield	Pauls Farmer & Chadwick
August 20th	Slimbridge	Trevor Evans + Warden
August 30th	Ringing Demo	Lyndon Roberts & GVRG
Average attendance, summer session		9.7

Second winter session 2003 (3 walks)

October 12th	Uphill	Don Cullen
November 20th	Ham Wall	Warden & Richard & Ann Crawford
December 29th	Chew	Paul Farmer
Average, second winter		9.0

Fieldwork 2003.

Members of the society were involved in a wide variety of national and local

surveys in 2003. These included the national Breeding Bird Survey, which monitors all common species annually and covered 185 local squares this year, the Waterways survey, Heronry survey, WeBBS counts of waterfowl and waders, a national Woodcock Survey, the national House Sparrow survey, the nest record Card Scheme and the national ringing scheme.
They also participated in BTO Garden Birdwatch, Bristol Birdwatch, and the societies own 30 year old Winter Garden Survey. They continued to monitor wintering Blackcap and Chiffchaff populations, and winter populations through the Winter Bird Counts.

Involvement with Local Authority.
The results of BBS work is sent to the four Unitary authorities Environmental departments, and in Bristol is used as part of the annual Quality of Life audit.
Bristol Birdwatch is part of the work of the Local Agenda 21 Biodiversity committee, which has revealed the substantial role played by gardens in sustaining the City's biodiversity.

Geological Section Report

Minutes of the Annual General Meeting held at 7.15pm on Wednesday 14th January 2004 in the Department of Earth Sciences, Wills Building, University of Bristol. The President Mr. David W. Cope was in the Chair.

1. Apologies.
   None

2. Minutes of the 2003 Annual General Meeting.
   These were circulated and approved.

3. Matters arising.
   This year, again, the Presidential Address was replaced by a lecture.

4. Secretary's Report.
   This was distributed and accepted and the meeting thanked Simon Carpenter for organizing the year's lectures in the absence of Paul Stevens.

5. Field Secretary's Report.
   This was circulated and accepted and the meeting thanked Simon Carpenter for arranging the year's field meetings.

6. Treasure's Report.

The un-audited accounts were approved and David Strawford was thanked for his clear presentation.

7. Election of Officers and committee for 2004.

The meeting elected the following:

President	David Cope
Secretary	Vacant
Field Secretary	Simon Carpenter
Treasurer	David Strawford
Committee	Margaret Poolman
	Paul Williams

8. Any other business.

The Department was thanked for its welcoming venue for our lectures.

Geological Section
Field Secretary's Report 2003

The following excursions and activities were organised for the 2003 period

Saturday 22 February	**Wick Quarry** Joint event with Bath Geological Society Leader: John Parkin
Sunday 23 March	**Manor Farm, Aust, South Gloucestershire** Joint event with Bristol Cycling Campaign Leader: Simon Carpenter.
Sunday 15 June	**Manor Farm, Aust, South Gloucestershire** Joint event with Bath Geological Society Leader: Elizabeth Devon.
Monday 25 August	**Rock & Fossil event: Bristol & Bath Railway Path, Saltford** Joint event with Bath Geological Society Leaders: Elizabeth Devon & Simon Carpenter
Saturday 18 October	**The Somerset Coal Canal** Joint event with Bath Geological Society Leader: David Workman

Saturday 8 November **Annual Reunion of the Geologists' Assoc, University College London**
Joint event with Bath Geological Society
Leaders: Elizabeth Devon & Simon Carpenter

The 2003 season of excursions and activities followed a similar pattern to previous years with a mix of field trips to sites of geological interest, geological site clearance projects and a promotional event.
The March meeting was slightly unusual in that the Society joined the Bristol Cycling Campaign for a geology trip with a difference – with all participants on bicycles.
The 'Rock and Fossil' event on the August Bank Holiday Monday was particularly successful with over 500 people stopping on the Railway Path at Saltford to find out more about the local geology and the societies that promote it. Volunteers from the BNS, Bath Geological Society and the West of England Geologists Association are thanked for their time and support. The event received good press coverage in the local papers. This is now an annual event and with the help of funding from the Geologists' Association Curry Fund and the Bristol Naturalists' Society Hector Hockey fund two large banners had been designed to promote the event on the day. The Bristol Naturalists' Society Geological Section combined with Bath Geological Society for a number of excursions – so thanks are due to their members and leaders as well as ours for making the 2003 season so successful.

Simon Carpenter
Field Secretary

General Field Meetings

8 March Sheila Garden Kew Gardens
Members enjoyed a visit to Kew Gardens despite chilly, and sometimes damp, weather. Special features were the Orchid display, 'Crocus Carpet' and the imaginative Evolution House.

12 April Anne Donnell Horner Woods
A 2½-mile walk in this lovely wood with distant views of Red Deer, and the Gorse in full flower. Alternative-leaved Golden Saxifrage was found and many common woodland birds were seen.

10 May Sue and John Prince Cotswold Water Park
On a blustery day two walks were taken – north and south of Neigh Bridge. Reed, Sedge, Willow and Garden Warblers were heard and Hobbies seen hunting low over the water. A Nightingale was briefly heard.

14 June Anne Donnell Forest of Dean

A walk starting at the Arboretum followed forest tracks. A Nuthatch was very evident and various warblers were heard. Several Buzzards were seen during a quick visit to New Fancy viewpoint.

19 July Mary Morris Sapperton Valley and Siccaridge Wood

Ideal weather conditions ensured a successful return visit to this Gloucestershire Wildlife Trust reserve, where a variety of limestone-loving flowers and butterflies were identified in the valley and on Daneway Banks. The ancient Siccaridge woodland is home to the Angular Solomon's Seal but, sadly, it was not found. Returning along the canal path Grey Wagtails were spotted.

6 September Don Cullen Exe Estuary

A walk along the estuary path at Powderham and then across Dawlish Warren sand dunes to the bird hide on a sunny day, but with a cold wind. Excellent bird sightings which included Sandwich Tern, Black-tailed Godwit, Redshank, Shoveller, Sanderling and a lovely view of a Gannet flying in.

11 October Sheila McCarthy Ravensroost Wood, Swindon

A sunny day enhanced the autumn colours in Ravensroost Wood and The Firs, both remnants of the medieval Forest of Braydon. Trees included Oaks of great size, Wild Service Tree and Small-leaved Lime. A few butterflies were seen. Thirty-three species of fungus were identified including *Ganoderma resinaceum*, *Gymnopilus junonius* and *Pleurotis dryinus*

Report of Council 2003

1. The aims of the Bristol Naturalists' Society for 2003 were "the promotion of education and research into natural history, including geology, with special reference to the Bristol District; and the promotion and conservation of the British fauna and flora, and protection of geological and geomorphological sites".

2. The Society's activities consisted of sectional and general, indoor and field meetings. The Society's specialist Sections covered Botany, Geology, Invertebrates and Ornithology, and there was an informal Mammal group. The preparation and distribution of the Society's publications, and the maintenance and development of its Library, consumed the greater part of Society's income, and those activities were managed by committees that worked to plans and budgets agreed by Council (the Trustees).

3. Twenty two talks and 51 field meetings were organised by the Society during the 2003. These offered a diverse and interesting programme of activities, concentrating particularly, but not exclusively, on the Bristol District. There were:
5 General talks and 7 General field meetings
3 Geology talks and 5 Geology field meetings
7 Ornithology talks and 15 Ornithology field meetings
2 Invertebrate talks and 5 Invertebrate field meetings
5 Botany talks and 19 Botany field meetings

Poster publicity and the Society website (www.bristolnats.org.uk) were used to publicise talks and field meeting to members and visitors. Particular efforts were made to encourage new members. A multi-media projector that had been purchased in the previous year was put to good use by several of the visiting speakers and at promotional events.

4. The Publications Committee was responsible for the production and distribution of the Society's "monthly" *Bulletin,* and annual *Proceedings* (under the name of *Nature in Avon*). In conjunction with the Bristol Ornithologists' Club the Society also produced the *Avon Bird Report.* The Committee was also responsible for the Society website, which was improved and updated regularly.

Nature in Avon volume 62 for 2002 was published in November. This 120 page issue celebrated the 140th anniversary of the Society. The 2002 issue of the Avon Bird Report included an article on 15,000 years old bird bones from Mendip caves. The Avon Bird Report was judged as one of the top county bird reports.

Ten issues of the "monthly" *Bulletin*, the Society's newsletter, and two six monthly programmes, were sent to members. The Bulletin, an important link with the membership, continued to develop in character and in page numbers, resulting in a very positive response from members. The Society's website had a regularly updated news page, and held the current monthly Bulletin and previous issues. It provided key information services to members and others, and was linked to other natural history sites in the region. During the year a link was made to the Leeds University site where the herbarium of Miss Ida Roper, the first lady president of the BNS (in 1913), had been put on-line.

5. The Library Committee managed the Society's Library, housed in the Bristol City Museum and Art Gallery. The Committee ensured regular and frequent opening of the Library (on 99 days) for the benefit of members, maintained existing stocks, and acquired new publications. Subject to security needs, arrangements were made for access to the collections by non-members, such as

Museum and University staff. The Library was used by 46 members who borrowed 272 items. A special Library event was held in November in cooperation with the Museum's Natural History department to promote all the library resources to members, new and established. During the year substantial progress was made adding information to the library database, including all journals and a large number of books.

Research and Conservation

6. Records of observations made by members as part of both local and national recording schemes were submitted to Bristol Regional Environmental Records Centre, and formed the basis of the biota sections of *Nature in Avon.* Surveys included botanical, mammal, invertebrate and ornithological recording schemes. Members of the Society assisted with data entry at BRERC.

7. The Society maintained close local links with the City Museum & Art Gallery, which housed its Library, with Bristol University (especially the Earth Sciences Dept.), with both the Avon, and Somerset, Wildlife Trusts, VOSCUR (The Voice of Bristol's Community and Voluntary Sector), Avon Gorge & Downs Wildlife Project and with the Bristol City Council. In response to an appeal in 2002, a grant of £1000 had been made from the Memorial Fund to the AWT towards the planned purchase of Prior's Wood and Bourton Combe. That was part of a larger funding bid by AWT which was in fact unsuccessful and AWT returned the donation in 2003. Regionally the Society linked with the South West Naturalists' Union, and nationally it was involved with the British Trust for Ornithology, Botanical Society of the British Isles, the Woodland Trust, and Royal Entomological Society.

8. The Society continued to be represented at meetings of the Leigh Woods Advisory Committee. The Committee received presentations concerning the proposed management of the Woods by the National Trust and their programmes of public access and education. A useful interchange of information continued with the Society providing comment representing the considerable expertise resident particularly in the Society's Council.

9. Members were involved with the Local Agenda 21 Action Plan Biodiversity Committee, and participated in Bristol Bird-watch, a scheme organised by that committee, administered by Avon Wildlife Trust, and funded by Bristol City Council. Some 3000 individuals (including Society members) participated over three winters and the analysis by a member of the Society gave a greater insight into the significance of gardens for bird life in winter than existed anywhere. Information from this survey was used by the BTO in its report to the Department for Environment, Food, and Rural Affairs on the decline of the Starling and House Sparrow. Members were involved in the following bird

surveys:- BTO Breeding Bird Survey (helping to cover 185 1-km squares in the region to monitor breeding bird populations); a 1km atlas of the City of Bristol; a national waterways survey; a national heronry survey (numbers locally are at an all-time high); the 29th year of a winter garden survey; an over-wintering warbler survey; a national woodcock survey; national duck and wader counts (WEBBS); and local and national winter farmland bird surveys.

10. The Society was represented at the initial meeting of the new Living Rivers project, designed to improve the habitats of all the streams flowing through Bristol and was involved in the monitoring process. Members took part in initiatives of the Frome Forum, hosted by the Forest of Avon, designed to raise public awareness of the wildlife value of the River Frome flowing into the centre of Bristol. A quiet year for the Mammal Group with the secretary becoming a father but still finding time to complete a small mammal trapping survey at the Wildlife Trust's Clapton Moor Nature Reserve. Otter surveys continued in conjunction with the North Somerset Otter Group. That survey continued to track the welcome return of Otters to North Somerset. A small mammal trapping exercise was carried out with the Watch Group at the Grove School Nailsea. This was the third year that this has been organised and it continued to be very popular.

11. The *Butterflies of the Bristol Region* was published by the Bristol Regional Environmental Records Centre (BRERC) in July. This book (the second in a planned series of wildlife atlases, following the publication of the *Flora of the Bristol Region* in 2000) summarised the results of the Avon Butterfly Survey. Members of the Society contributed records to that Survey during the 1990's and also contributed sections of text to the final publication. Grants previously awarded by the Society, to assist production, were duly acknowledged in the book. As well as current distribution maps it included information on butterfly recording (and collecting) over the last 150 years. Over that time the Bristol Naturalists' Society played the lead role in the study of our butterfly populations, through members such as Alfred Hudd in the 19th century. Members of the Society attended the launch of the book at Borders Bookshop, Clifton on 3rd July.

12. The Geological Section continued an active conservation programme working in close collaboration with Bath Geological Society and the Avon RIGS Group (Regionally Important Geological and Geomorphological Sites). A grant from the Hockey/ Milton Funds was agreed by Council to fund the production 2 large fabric banners to promote a 'Rock and Fossil' event on the Bristol and Bath Railway Path, near Saltford, Bristol. This annual event, which attracted good numbers, promoted our local earth heritage to the public.

13. A successful Hector Hockey fund application enabled the society to support

pond research work by member Robert Muston. Pond nets and sieves were purchased and council agreed that these would be retained by BRERC as a resource for other people in future.

14. A Society working group on conservation met, with the aim of increasing the Society's profile on conservation work, and a new conservation strategy was planned.

Promotion and Publicity

15. Posters announcing forthcoming meetings were produced on a regular basis and were displayed, particularly in libraries. In order to promote the Society's objects and to attract new members, stands were taken at Bristol Water's Chew Valley Open Day, BBC Naturefest, the Gorgeous Wildlife family fun day, Abbot's Leigh Parish Day and at a British Association meeting, several of these events attracting very large crowds.

16. Publications produced by the Society were offered for sale at events. The revenue from these was small, and the main benefit of attending was to promote the aims of the Society.

17. Individual members who were involved in activities such as making bird boxes, and growing plants, gave donations from sales, amounting to over £100. Other members generously gave donations, ranging from 50p to £86, particularly when paying their subscriptions. Total donations to Society funds exceeded £500.

Organisation and Membership

18. The Bristol Naturalists' Society is an unincorporated association, registered charity no. 235494. The Society's activities are governed by the Rules, adopted in 1971, and amended in 1993 and 1999. All involved with the running of the charity in 2003 were volunteers; there were no paid officials. The time provided by volunteers was considerable, and was crucial in the success of the Society. It was necessary to employ the services of an accountant to help with the backlog of accounts. The officers and members of Council were elected by members of the Society at an Annual General Meeting, held on 18th January 2003. The names of those proposed by the previous Council had been circulated to all members in the December 2002 issue of the Society's Bulletin and no further names were proposed by members. Those elected, together with the officers of Sections, served as the Trustees of the Society for 2003. Members were also elected to the Publications, Library, and Hector Hockey Fund Committees. Council and Library Committee meetings continued to be held at Clifton College.

19. At the end of 2003 Society membership was 665,a welcome increase of 15

over the previous year. Amongst new members the Society was delighted to welcome the Lord Mayor of Bristol and the Editor of the BBC Wildlife Magazine. The deaths were reported of Mr William Bigger, Miss H R Knight-Bruce, Mr John Maxwell, Mrs P A Naish, and Miss Betty Winter.

20. Council agreed that subscription rates for 2004 should be raised to the following amounts:
Full Member - £16.50. Second named member in household - £3.50.
Associate member (18-21 years) £8.50 Corresponding member - £12.50
Junior member (12-18 years) - £3.50 It was hoped to hold these rates for at least four years.

21. The Society's official address was Bristol Naturalists' Society, c/o The City Museum and Art Gallery, Queen's Road, Clifton, Bristol, BS8 1RL. The Society's main bankers were Lloyds TSB, 58 Queen's Road, Clifton, Bristol BS8 1RQ.

22. The Trustees' powers regarding investment etc. are prescribed in the Society's Rules. Council previously transferred from the Treasurer's Account monies representing the Memorial, Conservation and Library Funds to a new Charities Aid Foundation account. These funds were used to support projects as decided by Council. The Hector Hockey and Milton Funds, and an Ornithological Section Special Fund, were held in Income Bonds and a National Savings Account. Grants from the Hockey Fund were governed by the Rules of that Fund. Council had agreed previously that the monies designated as the Milton Fund would be used to support "Hockey" applications also, and both funds were involved in 2003. Sections had individual bank and building society accounts holding sufficient funds to cover running costs.

23. During the year the financial reporting of the Society was brought completely up to date with the production of the Accounts for the years 1999, 2000, 2001 and 2002. These were all approved by the Trustees, and the subsequently the Charity Commission confirmed that all required documentation for our charity had been received. Council agreed that the accounts for those years would be published in shortened form, with full copies being made available to any member on request. Gift Aid contributions were of substantial benefit to the Society, with nearly 30% of members having signed up. Insurance cover for the Library contents proved a problem, the premium demanded by previous insurers having tripled – "because of company policy". It was very difficult to identify a "replacement" value for the Library contents. In response to a need identified by the Auditors, Council agreed a "Reserves Policy", but had not finalised a "Risk Management Strategy" by the end of the

year.

Thanks

24. Grateful thanks are due to members who have helped the Society to meet its objectives by contributing their time in many ways, and have given generously to BNS funds. Special mention must be made to members of the Society who continue to save the Society substantial postal charges by delivering Society publications by hand, and those who distribute posters. The Society acknowledges with gratitude the facilities and support given by the Earth Sciences Department, University of Bristol, Dr M S Spurr, Headmaster of Clifton College and Mr Simon Garrett – Head of Education at Bristol Zoo Gardens for the use of their premises for meetings and Mr Stephen Price, Head of Museums, Bristol City Museum and Art Gallery for continued support of the Society library.

Plans for the Future

20. The Council of the Society for 2004 will be appointed on Sat 18th Jan and those Trustees will be responsible for that year's strategic planning.

APPENDIX 1. The Society's Trustees on the day this report was agreed were:- Mr S Carpenter (President), Mr R Barnett, Mr RL Bland, Mr P Belcher, Mr D W Cope, Mr T Corner, Mr DB Davies, Dr W Dixon, Mr E Drewitt, Mr DB Frost, Miss S. Garden, Dr M Hill, Mrs A Hollowell, Miss AJ Leivers, Miss S McCarthy, Mrs P Millman, Mr B Morris, Miss A Pedlow, Mr S Reece, Dr H Rose, Mr. AG Smith, Mr DWR Strawford, Mr RG Symes, Mr SM Taylor, Mr DPC Trump, Mrs H Willmott, Mrs AM Wookey, Mr NJ Wray.

Library Report for 2003

Reports of new accessions, featured regularly in the Bulletin, were welcomed by members. A new library software package was evaluated, but found wanting for the Society's needs. Development of the existing computer database continued and titles of all journals held were entered. A start was also made on entering titles of books; labels were added to those books that had been recorded. Library maintenance activities included some notable progress with sorting and removing surplus foreign (Polish) journals, which were to be given to the Somerset Archaeological & Natural History Society.

A new security system of access was introduced by the Museum. Resolution of long-standing heating problems was welcomed by committee members. Views on access for disabled people were put forward at a Museum meeting. The "Open Day", held jointly with the Museum Natural History Section, was attended by 8 new and existing members.

46 (51 in 2002) members made 279 (341) visits to the Library and borrowed 298 (272) items. 6 (11) of these visits were made by new members. 2 members involved in borrowing large amounts of material for special projects. 20 journals were received by subscription, 37 by exchange and 8 journal runs were received as gifts. 17 books were purchased. 17 books, 26 issues of journals, and 22 pamphlets/ off-prints and reports, which had been donated, were accepted into the library stock. For these donations we were indebted to Dr. R. Bradshaw, Ms. J. Copeland, Mr. Raymond Holland, Ms. L. Houston, Dr. M.H. Martin, Mr. P.J.M. Nethercott, Mr. F.H. Peddle, Mr. P. Stevenson, Mr. R.G. Symes, Mr. S.M. Taylor, Mr. D. A. Wilson, Bath Natural History Society, The Biodiversity Directorate (Bristol), Bristol Environmental Records Centre (BRERC), English Nature, and The Royal Society. Special nameplates were added to items donated.

Mrs. A.F. Hollowell was re-elected as Honorary Librarian. The Library Committee met on 4 occasions. Members were Mr. R.G. Symes (Chair), Mr. R.L. Bland, Mr. P.J.M. Nethercott, Mr. B. Tizard, Mr. D.P.C. Trump, Mr. D.A. Wilson, Mrs. A.M. Wookey, and Mr. M.A.B. Wordsworth. The Society's Archivist was invited to attend meetings. Members continued to staff the Library from 12.30pm to 1.30pm on Wednesdays, and from 10.15am to 12.00pm on Saturdays. The Committee completed the year's work well within the budget agreed by Council, mainly because insurance cover for books and furniture had not been resolved satisfactorily.

In accordance with the charitable status of the Society, but subject to appropriate security considerations, access to the Library was made available to others, particularly by arrangement with the University of Bristol. 7 visits were made by members on the staff of the City Museum, 3 by non-member Museum staff. All members of the Committee are thanked for their contributions during 2003. The Society also thanks Mr. Stephen Price, Head of Museum Services, Bristol City Council, for continued use of the Library room, and for the assistance given to members during the year by Museum staff, and welcomes the continued use made by the Library by Museum staff.

Bristol Naturalists' Society Annual Accounts 1999 – 2002

Statement From The Hon. Treasurer.

The annual accounts of the Society for the years 1999 to 2002 have been audited by Harwood, Lane & Co., and approved by Council (the Trustees). Copies have been sent to the Charity Commission, who then acknowledged that the Society's accounts were fully up to date. In view of the numbers of pages of this publication which would be needed to publish the reports for those years Council decided to publish just the latest, for 2003. The Hon. Secretary will provide copies of the reports for the intervening years on request to any member.

Bristol Naturalists' Society. Registered Charity No. 235494.

Report And Financial Statements For The Year Ended 31.12.2003

TRUSTEES' REPORT FOR THE YEAR ENDED 31 DECEMBER 2003

The Trustees present their report along with the financial statements of the charity for the year ended 31 December 2003. The financial statements have been prepared in accordance with the accounting policies described and comply with the charity's trust deed and applicable law.

Objects of the charity, principal activities and organisation of our work

The Bristol Naturalists' Society is constituted by rules adopted 4th November 1971, and amended 2nd December 1993 and 28th January 1999. The objectives of the charity shall be :-

The promotion of education and research into natural history including geology with special reference to the Bristol District, and the promotion of the conservation of British fauna and flora and the protection of geological and physiographical sites.

The Charity is managed by a Council (the Trustees) who meet approximately nine times a year, and has general meetings, and specific section meetings. The Sections manage their own financial affairs, electing a President and Secretary each year. Sections are grant aided by council from the general funds and largely use the funds to meet the costs of speakers and of miscellaneous items.

Development, activities and achievements this year.

The Trustees consider that the performance of the charity has been most satisfactory.

Financial Review

The Trustees report a surplus for the year of £2,122 (2002 deficit of £3,615).

Recovery of income tax through Gift Aid was an important factor.

Risk Management

The Trustees actively review the major risks the Society faces on a regular basis. They believe that maintaining reserves at current levels, and reviewing annually the key financial systems, particularly assessing the effects of the 2004 subscription increases, will provide sufficient resources in the event of adverse conditions. The Trustees have examined operational risks faced by the Society and confirm that they have established systems to mitigate any judged to be significant e.g. by limiting authority for signing cheques, withdrawing funds, and committing expenditure.

Reserves Policy

A formal reserves policy was agreed in 2003

1. The BNS needs reserves to allow it to be pro-active and flexible in promoting its charitable aims, without having to wait for subscription and donation income to accumulate.
2. The Society should endeavour to maintain as a minimum reserve an amount about equivalent to a year's subscription (as a guide, approximately £8,000).
3. The reserve is already established at the appropriate level, and will be maintained by working to agreed budget forecasts and limiting expenditure to prevent dropping below the agreed reserves level. Excess monies identified at the year end will be re-allocated to one of the designated funds.
4. A budget for the year will be agreed by Council by their March meeting, and monitored by reports presented in June, September, and November. The Reserves Policy will be reviewed by each new Council in agreeing the budget for the year.

Statement of Trustees' responsibilities

The Trustees are required by law to prepare financial statements for each financial year which give a true and fair view of the financial activities of the charity and of its financial position at the end of that year. In preparing those financial statements the Trustees are required to:

- select suitable accounting policies and apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether the policies adopted are in accordance with the Charities Act 1993 and with applicable accounting standards and statements of recommended practice, subject to any material departures disclosed and explained in the financial statements;
- prepare the financial statements on a going concern basis unless it is inappropriate to assume that the charity will continue in operation.

The Trustees are responsible for keeping proper accounting record which disclose with reasonable accuracy at any time the financial position of the charity and enable them to ensure that the financial statements comply with the Charities Act 1993. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Approval This report was approved by the Trustees on 01 June 2004 and signed on their behalf.
S Carpenter. Trustee

Independent Auditor's Report to the Trustees of Bristol Naturalists Society

We have audited the financial statements that have been prepared under the historical cost convention and the accounting policies described. This report is made solely to the charity's Trustees, as a body, in accordance with the Charities Act 1993. Our audit work has been undertaken so that we might state to the charity's Trustees those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law we do not accept or assume responsibility to anyone other than the charity and the charity's Trustees as a body, for our audit work, for this report, or for the opinions we have formed.

Respective responsibilities of Trustees and auditors

As described the charity's Trustees are responsible for the preparation of financial statements in accordance with applicable law and United Kingdom Accounting Standards. Our responsibility is to audit the financial statements in accordance with relevant legal and regulatory requirements and United Kingdom Accounting Standards

We have been appointed as auditors under section 43 of the Charities Act 1993 and report in accordance with Regulations made under Section 44 of that Act. We report to you our opinion as to whether the financial statements give a true and fair view and are properly prepared in accordance with the Charities Act 1993. We also report to you if, in our opinion, the Report of the Trustees is not consistent with the financial statements, if the charity has not kept proper accounting records, if we have not received all the information and explanations we require for our audit, or if information specified by law regarding Trustees' remuneration and transactions with the charity is not disclosed. We read the Report of the Trustees and consider the implications for our report if we become aware of any apparent mis-statements within it.

Basis of opinion

We conducted our audit in accordance with Auditing Standards issued by the Auditing Practices Board. An audit includes examination, on a test basis, of evidence relevant to the amounts and disclosures in the financial statements. It also includes an assessment of significant estimates and judgements made by the Trustees in the preparation of the financial statements, and of whether the accounting policies are appropriate to the charity's circumstances, consistently applied and adequately disclosed. We planned and performed our audit so as to obtain all the information and explanations which we considered necessary in order to provide us with sufficient evidence to give reasonable assurance that the financial statements are free from material mis-statement, whether caused by fraud or other irregularity or error. In forming our opinion we also evaluated the overall adequacy of the presentation of information in the financial statements.

Opinion

In our opinion, the financial statements give a true and fair view of the state of the charity's affairs as at 31 December 2003 and of its incoming resources and application of resources, including its income and expenditure, in the year then ended and have been properly prepared in accordance with the provisions of the Charities Act 1993.

Harwood, Lane & Co. Chartered Accountants and Registered Auditors, Unit 1-4 Crossley Farm Business Centre Swan Lane Winterbourne BRISTOL.
01 June 2004.

STATEMENT OF FINANCIAL ACTIVITIES FOR THE YEAR ENDED 31 12. 2003.

Incoming Resources	**Notes**	**Restricted Funds**	**General Funds**	**2003 Total**	**2002 Total**
Voluntary Sources	**2**	217	9197	9414	8,062
Trading Activities	**3**	0	870	870	764
Investment Income	**4**	899	136	1035	525
Sections Income		1844	2318	4162	2,742
Miscellaneous	**5**	0	14	14	1,311
Total Income		**2,960**	**12,535**	**15,495**	**13,404**
Resources Expended	**Notes**	**Restricted Funds**	**General Funds**	**2003 Total**	**2002 Total**
Direct Charitable Expenditure	**6**	1,699	9,730	11,429	1,2238
Fundraising Costs		0	390	390	1155
Management and Administration	**7**	0	1,554	1,554	3626
Total Resources Expended	**8**	**1,699**	**11,674**	**13,373**	**17,019**
	Notes	**Restricted Funds**	**General Funds**	**2003 Total**	**2002 Total**
Net Incoming/(Outgoing) Resources for the year	**14**	1,261	861	2,122	(3615)
Transfer between Funds		76	(76)	0	0
Balances brought forward at 1 January 2003	**14**	31,034	8,497	39,531	43,146
Balances carried forward	**14**	**£32,371**	**£9,282**	**£41,653**	**£39,531**

Statement of Recognised Gains and Losses. There were no recognised gains or losses other than those disclosed in the two reported financial years. The notes form part of these accounts.

BALANCE SHEET AS AT 31 DECEMBER 2003

	Notes	2003	2002
CURRENT ASSETS			
Debtors	**9**	2,630	3,557
Investment Accounts	**10**	11,271	12,709
Cash at bank and in hand		30,068	25,329
		43,969	**41,595**
CREDITORS; amounts falling due within one year	**11**	2,316	2,064
Net current assets		41,653	39,531
Total Assets less Total Liabilities		**£41,653**	**£39,531**
Capital			
Restricted Funds	**12/14**	32,371	31,034
General Funds	**14**	9,282	8,497
		£41,653	**£39,531**

Notes To The Accounts For The Year Ended 31 December 2003

1. Accounting Policies

1.1 Basis of preparation of accounts The accounts are prepared under the historical cost convention and in accordance with the Financial Reporting Standard for Smaller Entities (effective June 2002). In preparing the financial statements the charity follows best practice as laid down in the Statement of Recommended Practice "Accounting and Reporting by Charities" (SORP 2000) issued in October 2000 and SORP Update Bulletin 1 issued in December 2002.

1.2 Income Voluntary income and donations are accounted for as received by the charity. The charity also receives income from member subscriptions that are accounted for in the relevant period of membership. Income from trading activities is accounted for as received by the charity.

1.3 Expenditure on management and administration of the charity
Administration expenditure includes all expenditure not directly related to the charitable activity or fundraising ventures. This includes the related costs of the day to day running of the charity such as printing, postage and stationery, and it also includes the auditors' fees.

2. Voluntary Sources.	**2003**	**2002**
Subscriptions (including income tax refund)	8,692	7,634
Bequests	0	0
Donations		
- General Fund	505	183
- Memorial Fund	0	45
- Conservation Fund	217	200
	£9,414	**£8,062**
3. Trading Activities.	**2003**	**2002**
Proceedings Sales	870	636
Library Sales	0	4
Plant Sales	0	124
	£870	**£764**

4. Investment Income	**2003**	**2002**
Interest on Deposit Accounts (and interest on income tax refund)	**£1,035**	**£525**
5. Miscellaneous Receipts	**2003**	**2002**
140th Anniversary Dinner Income	0	1,291
Miscellaneous Income	14	20
	£14	**£1,311**
6. Direct charitable expenditure	**2003**	**2002**
Meetings	458	468
Library	515	1,128
Proceedings and Avon Bird Report	3,741	2,691
Bulletin Printing	907	871
White Sheet Production	69	43
Publications Distribution	1,341	1,193
Donations and Grants to other Organisations	0	0
Special Funds Expenditure	1,699	5,194
Sections Expenditure	2,546	0
Subscriptions to other Organisations	60	35
Publicity	93	615
	£11,429	**£12,238**
7. Management and administration	**2003**	**2002**
General Printing and Stationery	401	443
General Postage and Telephone	201	255
Subscription Refund	78	25
Bank Charges	0	18
Legal Fees	0	0
Public Liability Insurance	227	103
Audit Fee	494	470
Miscellaneous Expenditure	90	0
Sections Expenditure	63	2,312
	£1,554	**£3,626**
8. Surplus Resources Expended	**2003**	**2002**
The surplus of income over expenditure is stated after charging:		
- audit fees *(inclusive of VAT)*	494	470
9. Debtors	**2003**	**2002**
Trade Debtors	919	0
Prepayments	413	459
Subscriptions (Income tax	0	2,786

refunds for the years 1997-2002)		
Interest (on income tax refunds for the years 1997-2002)	0	219
Other Debtors	1,298	93
	£2,630	**£3,557**
10. Investments	**2003**	**2002**
National Savings Income Bonds	10,000	10,000
National Savings Investment Account	1,271	2,709
	£11,271	**£12,709**
11. CREDITORS: amounts falling due within one year.	**2003**	**2002**
Trade Creditors	87	0
Subscriptions in Advance	1,306	134
Accruals	494	1,930
Other Creditors	429	0
	£2,316	**£2,064**

12. Funds of the Charity

General Fund The General Fund of the charity is the charity's operational fund used for its day to day activities.

Memorial Fund This fund combines the former Williams Fund money with a legacy from Mrs Milton, and with the small amounts in the Harry Savory Illustrations Fund, and substantial bequests from others. The Memorial Fund receives legacies, and donations from friends in memory of past members. Grants are paid at the discretion of the Council, there being no specific aim for this fund.

Conservation Fund This is the name accepted as that of the former Conservation Appeal. It receives ad hoc donations and the Council makes occasional awards from this fund.
Library Fund This was initially the balance from a previous sale of surplus books from the Library that realised £3,300 - included in the 1995 accounts. Payments from the fund are at the authorisation of the Council.

Hector Hockey Fund This is treated as an endowment fund which supports projects and has a set of rules under which the HHF Trustees work and recommend to Council any grants to be made. It is represented by the National Savings Income Bonds and is part of the National Savings Ordinary Account.

Milton Fund Because the Hockey Fund attracted only small amounts of income as interest, and so only relatively small grants could be made, Council decided that £5,000 of the bequest from Mrs Milton would also be put into Income Bonds and that income used to back up the Hockey Fund, working to the same rules as that fund. The Milton Fund is not an endowment fund.

Ornithology Section Fund Monies in the Ornithology Section Special Fund are reserved by the Section as seed-corn funding should publication of an avifauna of the county become feasible.

Sustrans/Curry Fund This fund operated in 2003 as a one-off. Grants were received from the Geologists' Association Curry Fund, and later from Sustrans. The monies were then used to purchase banners for a geological event on a cycle path. The banners will be used elsewhere in future.

13. Analysis of net assets between funds	**General Fund**	**Permanent Endowment**	**Special Funds**	**Total**
Current Assets	11,598	5,187	27,184	43,969
Current Liabilities	-2,316	0	0	-2,316
	£9,282	**£5,187**	**£27,184**	**£41,653**

14. Statement of funds	**At 01.01. 2003**	**Income& Transfers**	**Expend- iture**	**At 31.12. 2003**	**December 2002**
General Fund	8,497	12,459	(11,674)	9,282	8,497
Permanent Endowment					
- The Hector Hockey Fund	5,206	165	(184)	5,187	5,206
Special Funds					
- Memorial Fund	15,393	451	0	15,844	15,393
- Conservation Fund	142	1,245	0	1,387	142
- The Library Fund	2,812	84	(7)	2,889	2,812
- Ornithology Section Fund	924	76	0	1,000	924
- Milton Fund	6,557	396	(889)	6,064	6,557
- Sustrans/Curry Fund	0	619	(619)	0	0
Total Restricted Funds	25,828	2,871	(1,515)	27,184	25,828
Total Funds	**£39,531**	**£15,495**	**(£13,373)**	**£41,653**	**£39,531**

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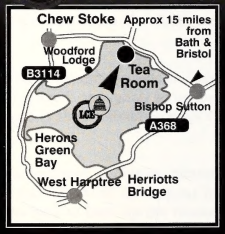

INSTRUCTIONS FOR AUTHORS

The editor welcomes original papers on the natural history of Avon and surrounding areas for consideration for publication in the Proceedings. Inexperienced authors may obtain advice from members of the Publications Committee. Authors should remember that their readers may not be specialists in the particular subject, and that unnecessarily technical language can be a barrier to understanding.

All papers for consideration should reach the editor by the end of November for publication in the following year. If there is likely to be a problem with this, the author should contact the editor in advance. All Society Reports and Biota should reach the editor by the end of January in the year of publication.

Whenever possible, text should be submitted on a disk as a file produced using a recent word-processor program (preferably Word 2000). Please specify the software and version used. The disk and a final hard copy version of the manuscript, if submitted, should match exactly. The wording should follow the style and format of the Proceedings, i.e. Titles in 10pt Arial Bold and body text in 10pt Times New Roman on an A5 page. An abstract should be supplied, and the text should be organised with appropriate headings and sub-headings. Submitted manuscripts should be double-spaced with wide margins and printed on one side of the paper only. Authors should retain a copy. Captions to illustrations should be given separately at the end of the text. Abbreviations should be defined on first use, but these should be avoided in the abstract.

Originals, not copies, of photographs, slides, line drawings, diagrams and maps should be submitted, returnable on request. Drawings and other diagrams should not be more than twice final size and made in monochrome. Photographs may be submitted as prints in colour or monochrome. These will normally be reproduced in monochrome, though consideration will be given to their publication in colour. Graphs, charts and simple diagrams should be produced by computer graphics: advice and help with this are available. Permission to reproduce copyright material is the responsibility of the author.

References should be listed at the end of the text, in alphabetical order of the first author's name, and should take the following form. (with book and journal title in italics and first line hanging).

Book: Author (Date). *Title*. Place of publication: Publisher. - e.g.

Rackham, O. (1986). *The history of the countryside*. London: J.M. Dent.
Clapham, A.R., Tutin, T.G. and Warburg, E.F. (1952) *Flora of the British Isles*. Cambridge at the University Press.

Paper: Author (Date). Title. *Journal Name*, volume (part), page nos. - e.g.

Ross, S.M. and Heathwaite, A. L. (1986). West Sedgemoor: its peat stratigraphy and peat chemistry. *Proceedings of the Bristol Naturalists' Society*, **44**, 19-25.

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Front Cover Broad bodied Chaser *Libellula depressa*
© *English Nature*